WC98-1175 - FRED ALGER MANAGEMENT
1 WTC 93 FL

WTCI-47-P

JOB NUMBER	COST	DOCS	RECEIVED	PAI DATE
WC98-1175-001	$ 3,000,000	7	06/29/98	07/20/98

FRED ALGER MGMNT — DUE:07/20/98
1 WTC - 93rd Floor — MEMO:06/30/98
New Construction/Office Space — STATUS:PRELIM.
DWG LOC.:SHELF S9 LFT
ACCT CODE: W2-405-083-981.175 — SPEC LOC:CAB 6/A

DISC.	REVIEWER	STARTED	DAYS	COMMENT	COMPLETE
*	Christine Chien	06/30/98	0.5	0/ 0	06/30/98

1 set — SELF CERTIFIED -- NOT AUDITED

DOCUMENT LIST	DATED	REVISED
Bkslp (Pisapia/Koebel)	06/29/98	/ /
Bkslp (Richarson/Pisapia)	06/26/98	/ /
Rev Req	06/26/98	/ /
TAA	06/11/98	/ /
Specs	06/15/98	/ /
Proj Manual	06/15/98	/ /
Dwgs	/ /	/ /

FILE RTP
TAA WC98-1175

Buckslip THE PORT AUTHORITY OF NY & NJ

To: Teresa Koebel Location: 88S

From: Ron Pisapia / WTC 51N / (212) 435-8562 Date 6 / 29 / 98

RE: TAA #WC98-1175
TENANT: FRED ALGER & CO. INC.

SUBJECT: PROFESSIONALLY CERTIFIED PROJECT

CC: J. Napolitano, J. Richardson

This will serve as notice that Engineering Quality Assurance will not audit the above-referenced project.

Please submit a copy of the signed and sealed TAA form for our records.

Thanks.

Ron Pisapia
Engineer of Projects
Quality Assurance Division

RP/lm

Attachment

Printed on Recycled Paper Soy Ink

PA 36 1-90

OFFICE COPY

PORT AUTHORITY OF N.Y. & N.J.
ENGINEERING DEPT. QUALITY ASSURANCE DIV.
DESIGN STANDARDS

JUN 29 1998
WC98-1175 (1)
RECEIVED
ALTERATIONS APPLICATION
TENANT CONSTRUCTION REVIEW UNIT

BUCKSLIP

TO: Ron Pisapia LOCATION: One WTC 57

FROM: Jennifer Richardson DATE 6/26/98

cc. 435G2014
T. Koebel, K. Piatt, J. Napotano

Please let me know if this project will be audited and if so will you require additional drawings. Also I will give you a signed and sealed TAX cover sheet at a later date.

Thanks

THE PORT AUTHORITY OF NY & NJ

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THE PORT AUTHORITY OF N.Y. & N.J.
ENGINEERING DEPT. QUALITY ASSURANCE DIV.
DESIGN STANDARDS

JUN 29 1998
WC 98-1175 (1)

RECEIVED
ALTERATIONS APPLICATION
TENANT CONSTRUCTION REVIEW UNIT

Self Certification

THE PORT AUTHORITY OF NEW YORK AND NEW JERSEY
TENANT ALTERATION APPLICATION REVIEW REQUEST

DISTRIBUTION		
No	To	Facility
4	QAD	51 N
1	D. Warren	PATC ZIP43
1	S.P. Chiao	88-S
1	G. Daly	88-S
2	S. Batra	2WTC 37FL
1	C. Bonacci	2WTC 35FL
1	C. Semah	2WTC 57FL
1	R. Rafferty	1WTC 66FL

Facility One FLR 93 TAA No. 98-175 Date 6/26/98

Application / Tenant Fred Alger

Consultant Gensler / Robert Director

Estimated Cost 3,000,000 Submittal No. One

Description of Work New Construction / Office Space.

Please review the attached (revised) application and send comments to:

Name: Jennifer Richardson

Location: 1 WTC - 88 - South Phone: 435-2014

7/2/98 DUE DATE

DESIGN DISCIPLINES

- [x] Architectural
- [ ] Egress Analysis
- [x] Structural
- [x] HVAC
- [x] Plumbing
- [x] Sprinkler
- [x] Electrical
- [ ] Utility > 600 V
- [ ] Civil
- [ ] Geotechnical
- [ ] Environmental
- [ ] Fueling
- [ ] Radio Freq. Coord.
- [ ] Corrosion Protection
- [ ] Elevator / Escalator
- [ ] Other_____

ATTACHMENTS

- [x] Document List
- [ ] Contract Drawings
- [x] Contract Specifications
- [ ] Tenant Response
- [ ] Computations
- [ ] Reports
- [ ] Catalog Cuts
- [ ] Other

DESCRIPTION

* Suren, please conduct a Structural review. Thanks.

Special Instructions Self Certification

OFFICE COPY

Copy To: ~~G. Gaeta~~, J. Napolitano, E. Monteverde, N. Seliga

T. Koebel, A. Freeman (Proj. Mgr.)

THE PORT AUTHORITY OF N.Y. & N.J.
ENGINEERING ~~DEPT. QUALITY ASSURANCE DIV.~~
DESIGN STANDARDS
Signature

JUN 29 1998
WC98-175 (1)
RECEIVED
ALTERATIONS APPLICATION
TENANT CONSTRUCTION

PA 531
6-75

File Fee #
Contract #

THE PORT AUTHORITY OF NY & NJ
One World Trade Center, New York, N.Y. 10048

For Port Authority use only	
FACILITY WTC	APP. NO. 98-1175
DATE / /	APPLICANT'S NAME

TENANT CONSTRUCTION OR ALTERATION APPLICATION

APPLICANT MUST READ THE TERMS AND CONDITIONS PRINTED ON THE REVERSE HEREOF

The Applicant shall not commence performance of any of the said work prior to the receipt by Applicant of a copy of this application duly signed in Part Two hereof on behalf of The Port Authority of New York and New Jersey. Upon receipt thereof, the Applicant agrees to perform said work in accordance with the following "Information to be Furnished by Applicant" and to comply with and be bound by all requirements and conditions set forth below under the remarks, if any, in Part Two hereof and the terms and conditions set forth on the reverse hereof.

PART ONE: Information to be furnished by Applicant (Refer to your lease or permit for required information)

Permission is hereby requested to perform the following described work on the space occupied by the Applicant

AT (FACILITY)	PURSUANT TO (LEASE, SPACE PERMIT) NUMBER	LOCATION (BUILDING NUMBER OR AREA) OF SPACE TO BE ALTERED
1 WTC		93rd Floor, North, East, West of building

DESCRIPTION OF WORK AND REASON
Buildout of office space including support spaces, pantries, conferenc rooms & trading.

ESTIMATED COST OF WORK	ESTIMATED TIME TO COMPLETE (DAYS)	STARTING DATE	COMPLETION DATE
$ 3,000,000	70	6 / 30 / 98	11 / 20 /

Plans: Prints of each drawing must be submitted with copies of application. Include floor plan and show area affected by proposed work (size 8 1/2" x 11" or larger).

TITLE OF DRAWING	DRAWING NUMBER	DATED
SEE ATTACHED LIST		

NAME & ADDRESS OF CONTRACTOR (IF NOT KNOWN, SUBMIT LATER)	NAME AND ADDRESS OF ENGINEER OR ARCHITECT	TELEPHONE NUMBER / LICENSE NUMBER
HENEGAN CONSTRUCTION CO, INC. 750 West 30th Street New York, NY 10001	Walter A. Hunt, Jr. Gensler - One Rockefeller Plaza New York, NY 10020	492-1400

SEND CORRESPONDENCE TO:
(NAME AND ADDRESS OF EMPLOYEE IN CHARGE OF WORK)
Fred Alger & Co., Inc.
75 Maiden Lane
New York, NY 10038
TELEPHONE NUMBER 212-806-8800

APPLICANT'S NAME (AS IT APPEARS ON LEASE OR PERMIT)
David Alger

ENGINEER OR ARCHITECT CERTIFICATION

I have supervised the preparation of plans and specifications for the entire work represented hereon and hereby certify that they conform to the requirements of the respective enactments, ordinances, resolutions and regulations of the City, town or municipality in regard to the construction and maintenance of buildings and structures and in regard to health and safety which would be applicable if the Port Authority were a private corporation.

BY (SIGNATURE OF AUTHORIZED REP.)	TITLE	DATE	SIGNATURE OF LICENSED PROFESSIONAL ENGINEER OR ARCHITECT	DATE
David Alger	EXEC. V.P.	6/11/98	Walter A. Hunt Jr.	06/15/9

The Contractor by signing below agrees to all the terms and conditions on this application and printed on the reverse side thereof, including #5 indemnifying the Port Authority, and further agrees to be bound by all riders and schedules attached to this application

Signature: David Alger 6/12/98
(Contractor) Date

Address: 250 W.30th Street
New York, NY 10038

☐ The Applicant must check here if the Professional Certification Program is elected for tenant construction or alteration at the World Trade Center.

Signature: Walter A. Hunt, 06.15.98
(Applicant Officer/Partner) Date

Please advise the undersigned, in writing, when this work has been completed.

PART TWO: Prepared by Port Authority and returned to Applicant

The above Application is ☐ Approved ☐ Disapproved. Subject to the following conditions:

☐ Continued on Rider "A," "B," "C," "F," and "G" (Rider G will be included only for the Professional Certification Program)

THE PORT AUTHORITY OF NY & NJ

THE PORT AUTHORITY OF N.Y. & N.J.
ENGINEERING DEPT. QUALITY ASSURANCE DIV.
DESIGN STANDARDS
JUN 29 1998
WC98-1175 (1)
RECEIVED
ALTERATIONS APPLICATION
BY TENANT CONSTRUCTION REVIEW UNIT

INSPECTED BY	DATE	TITLE	DATE
	/ /	Manager of Tenant and Technical Services/WTD	/ /

OFFICE COPY

Quality Assurance Division
Design Standards

TAA No. ..... Charge Code: .....

Tenant: .....

REVIEW STATUS

Submission No. & Date	Response To	Coordinator's Initial	Memo Date	Approval Date	Facility Rider	Outstanding Comments	Remarks/Status	DWG/SPEC Location

SELF CERTIFIED --

NOT AUDITED

MECHANICAL, ELECTRICAL, PLUMBING, SPRINKLER AND TELECOMMUNICATIONS SPECIFICATIONS

FRED ALGER MANAGEMENT
75 Maiden Lane
Partial 93rd Floor
New York, NY
RDA No. 999.008.00

Owner

FRED ALGER MANAGEMENT, INC.
75 Maiden Lane
New York, NY

OFFICE COPY

Architect

GENSLER
One Liberty Plaza
New York, NY 10006

AND

ALISON SPEAR, AIA
131 East 70th Street
New York, NY 10021

THE PORT AUTHORITY OF N.Y. & N.J.
ENGINEERING DEPT. QUALITY ASSURANCE DIV
DESIGN STANDARDS
JUN 29 1998
WC 98-1175 D
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TENANT CONSTRUCTION REVIEW UNIT

Mechanical and Electrical Engineers

ROBERT DERECTOR ASSOCIATES
1156 Avenue of the Americas
New York, NY 10036

Dwg's	SUB	CAB. TUBE
Spec's	✓	6A

June 15, 1998

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15500	SPRINKLER SPECIFICATIONS	
16000	ELECTRICAL SPECIFICATIONS	

SECTION 00800
GENERAL AND SUPPLEMENTARY CONDITIONS
FOR MECHANICAL AND ELECTRICAL WORK

GS-1 GENERAL CONDITIONS

a. The General Conditions of the Contract, the American Institute of Architects Standard Document #A201 "General Conditions of the Contract for Construction", April 1987 edition, 14 articles, 24 pages, and the following supplementary requirements apply to all sections of this specification.

b. Where "General and Supplementary Conditions" specified in these documents modify the AIA General Conditions, they shall take precedence.

c. Where "General and Supplementary Conditions" clauses are repeated, it shall be understood as calling special attention to them or as a further qualification, and shall not be assumed as omitting any further clause of the General Conditions.

d. Maintain adequate protection of the work from damage, and protect the Owner's property and the public from injury or loss arising in connection with this work. Make good any such damage, injury, or loss, and accept exclusive liability and hold harmless the Owner and Engineer against injuries or claims therefore of all persons and any alleged damage to property in connection with the work. Erect and maintain at all times, as required by the conditions and progress of the work, all necessary safeguards for the protection of the workers and the public.

GS-2 DEFINITIONS

a. The terms "Contractor", "The Contractor", or "This Contractor" refer to the Contractor awarded the work or the "Contract".

b. The term "Owner" refers to Fred Alger Management, Inc., 75 Maiden Lane, New York, NY.

c The term "Landlord" or "Building Management" refers to the Port Authority of NY and NJ.

d. The term "Construction Manager" refers to Henegan Construction.

e. "Wiring" shall be understood to mean wires or cables, with conduit, fittings, boxes, etc., installed complete.

f. "Piping" shall be understood to mean all pipes, fittings, nipples, valves, and all accessories connected thereto.

g. "As shown", "as indicated", "as specified", "as scheduled", etc., refers to information on drawings or in the specifications.

h. "Existing" refers to work, material, or equipment in existence prior to date of these specifications and contract drawings.

i. "Remove" refers to material or equipment to be removed from building.

j. "Relocate" refers to equipment to be relocated as indicated.

k. "Reused" refers to salvageable components to be utilized.

l. The words "or equal", "or approved equal", "equal to", refer to substitution of manufacturer not specified which shall receive approval of Owner or Owner's representative in writing.

m. "Provide" shall mean "furnish and install" or "furnish labor and material required for installation of".

n. "Directed" shall mean as directed by Owner or Owner's representatives.

o. "Concealed", where used in connection with insulation and painting of piping, conduit, ducts, and accessories, shall mean that they are hidden from sight as in trenches, chases, furred spaces, pipe shafts, or hung ceilings; also where they are not hidden from sight in partly excavated or crawl spaces.

p. "Exposed", where used in connection with insulation and painting of piping, conduit, ducts, and accessories, shall mean that they are not concealed as defined above.

GS-3 INDEMNITY

a. Provision must be made to insure the "Hold Harmless Agreement" which reads as follows:

1. "The Contractor hereby agrees to indemnify and save harmless the Owner, Building Management, and Engineers from and against all liability claims and demands on account of injury to persons including death resulting therefrom and damage to property arising out of the performance of these contract documents by the Contractors's property. The Contractor shall, at his or its own expense, defend any and all actions at law brought against the Owner, and the same Owner's representative above and shall pay all attorney's fees and all expenses, and promptly discharge any judgments arising therefrom. These conditions shall also apply to any subcontracted operations."

2. The Contractor shall secure and protect the Work and shall bear and be liable for, and shall repair and replace all loss and damage of any kind which may happen to the Work at any time prior to the final completion and acceptance thereof from any cause whatsoever, and the Owner and Engineer will not, in any manner, be answerable or responsible for any loss or damage that shall happen to the Work or any part thereof, nor for any materials, equipment, tools, plant, facilities or other things that may be employed therein or placed upon the premises by the Contractor, the latter being solely responsible therefore until the Work has been fully accepted by the Owner.

3. Contractor hereby agrees, to the extent permitted by law, to assume the entire responsibility and liability for and defense of and to pay and indemnify the Owner, any lender providing construction or permanent financing for the Project, and the Engineer (collectively the "Indemnities") against any loss, expense or liability and will hold each of them harmless from any pay any loss, damage, cost or expense (including without limitation, judgements, attorney's fees, court costs and the cost of appellate proceedings),

which the Indemnities (collectively or individually) incur because of injury to or death of any person or on account of damage to property, including loss of use thereof, or any other claim arising out of, in connection with or as a consequence of the performance of the Work, and/or any act or omission of the Contractor or any of its subcontractor, officers, directors, employees, agents or anyone directly or indirectly employed by Contractor or anyone whose acts Contractor may be liable as it relates to the scope of this Contract. However, nothing herein contained shall require the Contractor to provide indemnification against the proportion of any liability for claims which are proven to have arisen from the negligence of the party asked to be defended, indemnified or held harmless. Contractor will purchase and maintain such insurances as will protect it from any costs and expenses relating to the foregoing, including, without limitation, contractual Coverage covering the foregoing indemnity, and shall provide Owner with certificates evidencing same in the form annexed hereto.

GS-4 INSURANCE TO BE PROVIDED BY CONTRACTOR

a. The Contractor shall, through agents and in amounts and by companies to be approved by the Owner, obtain, maintain in force during the period covered by the Contract and pay for such insurance as required herein. If the Contractor shall fail to deliver certificates for its insurance or the insurance of its subcontractors to the Owner within forty-eight (48) hours after demand, and in any event, prior to commencement of the Work on the Project, the Owner may obtain such insurance for the Contractor and pay premiums thereon, and the Contractor shall repay the Owner, on demand, any sum or sums paid therefore, together with interest thereon, or the Owner, may deduct such sum or sums, together with interest therein, from any money due or to become due to the Contractor under this Contract. As provided below, every policy of insurance required hereunder shall name the Indemnities as additional insured and shall provide for giving the Owner and the other Indemnities if so requested in writing thirty (30) days' prior written notice of the cancellation thereof.

b. Any policy of insurance covering the Contractor's own tools, plant and facilities against loss by physical damage shall include an endorsement providing that the Underwriters waive their rights of subrogation against the Owner and the Construction Manager.

c. The Contractor shall not commence work under this Contract until it has obtained all of the insurance referred to herein and Contractor and/or subcontractor shall be required to maintain the following insurance in amounts not less than those specified below:

1. Worker's Compensation in accordance with the laws of the State with Jurisdiction.

2. Employer's Liability insurance in an amount not less than $100,000.00.

3. Comprehensive General Liability/Umbrella Liability for:

   (a) Bodily Injury Liability Insurance

   (b) Property Damage Liability

with limits of $3,000,000/$5,000,000 each occurance/aggregate including, but not limited to, Comprehensive Form Premises - Operations, Explosion and Collapse Hazard, Products/ Completed Operations Hazard (2 years extension beyond completion of Project), Contractual Coverage, (including coverage for the Indemnity Clauses provided under this Contract) Broad Form Property Damage, Independent Contractors, Personal Injury (employees exclusion deleted) and 'X', 'C' and 'U' exclusions deleted.

(c) Comprehensive Automobile Liability

Comprehensive, Owned, Hired, Non-Owned with limits $500,000 combined single limit each occurrence.

(d) Contractor shall verify that these requirements are acceptable to the Owner. If not, they shall obtain insurance coverages in accordance with their requirements.

(e) Contractor shall obtain insurance coverage in accordance with Building Management requirements, which in some cases may be in excess of the above stated values.

d. The above insurance shall without liability on the part of the Owner for premiums thereof, include the following:

1. Endorsement as Additional Insureds of:

(a) Owner, Lender, Engineer and their partners, directors, officers, employees, agents, and representatives; and

(b) all other indemnities named in the Contract.

2. Thirty (30) Day Prior Notice of Cancellation to each name insured; and

3. Waiver of Subrogation.

e. The above policies shall be endorsed to contain the following wording verbatim:

1. "Owner is interested in the maintenance of this insurance and it is agreed that this insurance will not be cancelled, materially changed or not renewed without at least a thirty (30) day advance written notice to Owner and the other additional insureds of so requested in writing.

"Contractor hereby agrees, to the extent permitted by law, to assume the entire responsibility and liability for and defense of and to pay and indemnify the Owner, any lender providing construction or permanent financing for the Project, and the Engineer (collectively the "Indemnities") against any loss, expense or liability and will hold each of them harmless from any pay any loss, damage, cost of expense (including without limitation, judgements, attorney's fees, court costs and the cost of appellate proceedings), which the Indemnities (collectively or individually) incur because of injury to or death of any person or on account of damage to property, including loss of use thereof, or any

other claim arising out of, in connection with our as a consequence of the performance of the Work, and/or any act or omission of the Contractor or any of its subcontractors, officers, directors, employees, agents or anyone directly or indirectly employed by Contractor or anyone for whose acts Contractor may be liable as it relates to the scope of this Contract. However, nothing herein contained shall require the Contractor to provide indemnification against the proportion of any liability for claims which are proven to have arisen from the negligence of the party asked to be defended, indemnified or held harmless. Contractor will purchase and maintain such insurance as will protect it from any costs and expenses relating to the foregoing, including, without limitation, contractual coverage covering the foregoing indemnity, and shall provide Owner with certificates evidencing same."

"Coverage includes as Additional Insureds Owner, any lender providing permanent or construction financing for the Project, Engineer and their partners, directors, officers, employees, agents and representatives; and 2) all other Indemnities named in the Contract as respects worked performed by or for the Named Insured in connection with 'the Project'."

"The Insurance Companies waive their rights of subrogation against the Additional Insureds which may arise by reason of payment under the Comprehensive General Liability and Umbrella Liability policies in connection with 'the project'."

f. Contractor will be required to purchase and maintain such insurance as will protect it for the contractual indemnity of this project.

g. Upon request of the Owner, the Contractor shall add additional insureds at no expense to the Owner.

GS-5 SUBCONTRACTS

a. Should the Contractor engage a subcontractor, the same conditions applicable to the Contractor under this Contract shall apply to each subcontractor, including, but in no way limited to, this Indemnity.

GS-6 CANCELLATION, ETC.

a. The Owner is interested in the maintenance of this insurance and it is agreed that this insurance will not be cancelled, materially changed or not renewed without at least thirty (30) day advance written notice to Owner and the other additional insureds if so requested in writing.

GS-7 SHUTDOWNS

a. When installation of a part of any system (plumbing, heating, air conditioning, electrical or otherwise) requires a shutdown of any operating system, connect the partial system only after notification to and with approval of the Owner. Coordinate activities closely with those of Subcontractor's so the operation is restricted to as short an interval as possible and "out of service" time of these facilities is kept to a minimum. Any shutdown of the electrical system will be done out of hours as approved by Owner.

b. It is imperative that existing systems be maintained in continuous operation during the course of construction; if shutdowns are required to permit the disconnections and removal or reconnection of existing work, or final connection to be made to an existing system, they shall occur only during off-hours and only after power permission has been obtained from Building Management.

c. The Building Management requires not less than seven days notice for shutdown of any building system.

d. Where work during any shutdown period involves the draining and refilling of any water, chilled water, or any other piping system such draining and refilling shall be done by the Contractor. All fluids used for refilling should be of the same type and quality as those derived from the system.

GS-8 CUTTING, ALTERING AND PATCHING

a. The Contractor shall do all cutting, altering and rough patching as required for the installation of the work of all trades employed under this contract, including the restoring of existing work cut for or damaged by installation of new work, and where present work is removed. All materials and workmanship required in connection with cutting, altering and patching shall match the existing work in every respect.

b. All holes and openings occurring in the existing floors after equipment, partitions, floors, steel work, conduits and pipes are removed or installed shall be closed up with materials similar to the adjacent work.

c. The size and location of items requiring an opening, chase or other provisions to receive it shall be given to the Construction Manager by the trade requiring same in ample time to avoid undue cutting of any new work to be installed. This provision shall not relieve the Contractor from keeping informed as to the required opening, chases, etc., nor from responsibility for the correctness thereof, nor for cutting and repairing after the new work is in place.

d. The Contractor shall include all cutting, repairing and patching in connection with his work that may be required to make the several parts come together properly and fit it to receive or be received by the work of other trades, as shown on the drawings and/or specified, or reasonably implied by the drawings and specifications.

e. All repairing, patching, piecing-out, filling-in, restoring and refinishing shall be neatly done by mechanics skilled in their trade to leave same in condition satisfactory to the Engineer.

f. Materials and their methods of application for patching shall comply with applicable requirements of the specifications.

g. Cutting, repairing and patching shall include all items shown on the drawings, specified in the specifications or required by the installation of new work or the removal of existing work.

h. The Contractor shall protect and be responsible for the existing building, facilities and improvements. Any disturbance or damage to the work, the existing building, and improvements, or any impairments of facilities resulting from the construction operations, shall be promptly rectified, with the disturbed, damaged, or impaired partitions restored, repaired or replaced at no extra cost.

i. All alterations which are not indicated on the drawings not specified herein but necessary to make good existing work disturbed by reason of the work shall be restored to a condition satisfactory to the Engineer.

GS-9 DEMOLITION WORK

a. The Contractor shall perform all of the demolition work in overtime basis specified in the contract documents, and shall remove from the site all resultant debris and materials which are not to be reused.

b. None of the materials and fixtures removed from the work, except as otherwise shown or specified, shall be used in the new work.

c. A walk-through of the premises will be scheduled during the bid period to visually observe the extent of the demolition work associated with each trade. Each trade shall be fully responsible for all necessary demolition and removals associated with his work.

GS-10 SAFETY OF PERSONS AND PROPERTY

a. Carefully plan the work and see to it that it is executed in an organized orderly and safe manner. Danger and warning signs shall be prominently displayed, and exercise every precaution to offer the fullest protection to pedestrian traffic in and around the premises, building tenants and their guests, Owner's management and maintenance personnel, and Owner's representatives.

b. Pay particular attention to fire safety precautions during construction, particularly where welding is required. Storage of flammable and combustible material shall be as directed by the Owner.

c. Contractor shall conform to construction and building fire regulations as directed by Building Management. In addition to regulations and practices as required by local governing authorities. All requirements of these representatives shall be adhered to at no additional cost to the Owner and the contract.

GS-11 LAWS, RULES, PERMITS, FEES & REFERENCES

a. All work and materials shall be in full accordance with the latest rules and regulations of all Municipal Codes and State Laws or regulations and Building Rules and Standards. Nothing in these plans or specifications is to be construed to permit work not conforming to these Codes. In cases where Code requirements differ, the more stringent Code shall take preference.

b. Pay any royalties or fees required in connection with the use of any patented devices or systems, and save Owner harmless from any claims or lawsuits arising from such use.

c. Give all notices, obtain all required permits, perform all tests, and pay for all Local, State and Federal taxes, fees, royalties and other costs. File all necessary plans and obtain all approvals of all Municipal and State authorities having lawful jurisdiction. Secure and pay any necessary approvals, permits, inspections, etc., and deliver the official records of the granting permits to the Owner. This shall be done without additional cost to the Owner.

d. Federal Safety and Health Regulations: This Contractor must observe and abide by all requirements of Federal Safety and Health Regulations as established by Congress and known as the "Occupational Safety and Health Act of 1970".

GS-12 COORDINATION

a. Due to the type of installation, a fixed sequence of operations is required to properly install the complete system. Closely schedule the work in accordance with the requirements so that work will be installed with minimal disruption to the building occupants and operation procedures.

b. Carefully check space requirements with existing conditions, the Owner's representative and all affected Contractors to insure that pumps, equipment, ductwork, pipes, conduit, etc. can be delivered to the site, properly stored and installed.

c. Coordinate the work of the section with existing conditions and the work of other sections. The Contractor shall thoroughly acquaint himself with the work involved, and shall verify at the building all measurements necessary for the proper installation of the work, obtaining the same when necessary from the other Contractors and sections. Contractor shall also be prepared to promptly furnish to other Contractors any information relating to the work of this section necessary for the proper installation of other contracts and shall cooperate to secure the best progress of, and harmony between, the work of the different contracts and sections in the interests of the installation as a whole. Confer with other Contractors and Engineer for adjacent work to this section and arrange to have visible portions of work fit and harmonize in a manner satisfactory to the Owner's representative.

d. Examine all existing work or work previously executed by other Contractors which may be associated with the new work of this Contract and report any installation conflicts affecting installation of the new work to the Engineer. Commencement of work will be construed as complete acceptance of the installation conditions.

e. Check the construction drawings, shop drawings and equipment details of other contracts, trades and sections, noting all interferences, and immediately call to the attention of the Engineer who will make the proper disposition of same. Work shall be scheduled so as not to interfere with the work of other sections.

f. Wherever work under the contract requires information, material, equipment, etc. to be given to or received from other sections, these items shall be transmitted or requested expeditiously to maintain installation schedules and avoid delays in work of the other sections.

g. Perform the work at such time and in such manner as to minimize interference with building's normal operation. Notify Owner's representatives in advance each time a service outage or interruption will be required for the performance of some phase of the work. Schedule such service outage or interruption only after having received approval of date, hour, and time interval required thereof. Schedule or work as directed shall be followed as closely as possible.

GS-13 INTENT AND INTERPRETATION OF DRAWINGS AND SPECIFICATIONS

a. The specifications are accompanied by drawings indicating the general location of equipment and connections thereto. Unless specifically dimensioned, locations of equipment and routings are approximate. Scales on drawings are indicated for bidding purposes only. Drawings shall not be scaled for construction and manufacturing details.

b. Certain systems are diagrammatic and give the general arrangement only. No added compensation will be permitted for variations due to field conditions. Exact locations and arrangements shall be determined in the field on the basis of details indicated on approved shop drawings, and supplementary information issued by the Engineer, and shall provide for operating efficiency, neatness of appearance, and ease of maintenance.

c. In all cases where a device, apparatus, or part of equipment is referred to in the singular number, it is intended that such reference shall apply to as many such times as show or required to complete the work.

d. The work throughout shall be executed in the best and most thorough manner, under the direction of, and to the satisfaction of, the Owner who will interpret the meaning of the drawings and specifications, and shall have the power to reject any work and materials which, in their judgment, are not in full accordance therewith.

e. It is specifically intended, and must be agreed to by the Contractor submitting a bid under this specification that anything (whether material or labor) which is usually furnished as part of such equipment as is hereinafter called for (and which is necessary for its proper completion and operation) shall be furnished as a part of this contract without additional cost, whether or not shown in detail on the drawings or described in detail in the specifications.

f. Where disagreements occur between the drawings and the specifications, or within either document itself, the item or arrangement of better quality, greater quantity or higher cost shall be included in the contract.

g. Particular care should be taken so as not to affect in any way the basic design of any system. Changes in arrangements and/or sizes of piping, ductwork, conduit, panels, equipment, etc. shall not be effected without the prior written approval of the Engineer. Except for such changes as may be specifically approved by the Engineer or in accordance with approved alternates or options, all work must be in full accordance with the intent of the plans and specifications, complete in every way and ready for satisfactory and efficient operation when delivered to the Owner.

h. The drawings and specifications of other sections or contracts shall be checked for thorough coordination with work to be performed under this contract.

GS-14 EXECUTION OF WORK

a. Guarantee that the materials and workmanship supplied under the section and contract will be of the best grade, that the installation will be erected in a practical and first-class manner, that it will be complete in operation, nothing being omitted in the way of labor and materials required to make it so, although not specifically shown or mentioned herein and that it will be delivered in well-working order, complete and perfect in every respect with guaranteed service and performance.

b. Execute the work as fast as reasonably possible. At all times, keep a competent foreman in charge of the work, and facilitate the inspection of the work by the Owner.

c. Be responsible for the work until its completion and final acceptance and replace any of the same which may be damaged, lost or stolen, without additional cost to the Owner.

d. Contractor shall arrange for shop drawing production as prepared by piping engineers and sheet metal draftsman, and sketches to be performed in building premises when requested by Engineer.

GS-15 EXAMINATION OF SITE

a. Visit the building and specifically all areas designated for the installation, and become familiar with existing conditions; examine all drawings relating to the work, and become fully informed as to the extent and character of the work required. Determine any conditions which affect the work. Make a thorough site investigation before submitting bids. No allowances will be made for failure to avail of such information.

b. Take all necessary field measurements of existing conditions as required for fabrication and installation for work of this contract and assume complete responsibility of accuracy of such measurements.

c. Although the location of equipment be shown on the drawings in a certain place, the construction of the building may disclose the fact that the location for this work does not make its position easily and quickly accessible. In such cases, call attention to this fact to the Engineer well in advance of installing work for direction.

d. Investigate spaces, doors, and passages into and through which equipment must be moved and made arrangements for installing large pieces of equipment. Equipment shall be in section of sizes suitable for moving through restricted spaces and openings.

GS-16 STORAGE OF CONTRACTORS MATERIALS

a. Space within the building will be designated by the Owner for storage of tools, materials, equipment, etc. Provide any additional protection required, and assume all responsibility for damage of materials. Materials shall be received at the building in locations as approved by the Owner.

GS-17 USE OF BUILDING ELEVATORS

a. Usage of service elevators will be permitted as directed by the Owner for movement of materials and equipment to the designated installation areas. Use of these elevators shall be coordinated with the Owner prior to site delivery.

b. Passenger elevators will not be used without expressed direction of Owner well in advance to permit building arrangements if such work is to be authorized under normal circumstances.

GS-18 APPROVED EQUIPMENT AND MATERIALS

a. Most items of mechanical and electrical equipment and material are noted on the drawings or in the specifications with a manufacturer's name and catalog number. This designation is used to set the standard for construction, performance, operation and appearance. Products of other manufacturers will be considered and ruled upon by the Engineer. The submission of a substitution implies that the item has all necessary Underwriters' Laboratories, Board of Standards and Appeals, New York City MEA, National Electrical Code, New York City Electrical Code and New York City Electrical Advisory Board, etc. approvals. Should the item be found not to have such approval, it shall be replaced by the Contractor at no additional cost to the Owner.

b. Furnish information as required to demonstrate that the article, material, apparatus, product or process to be used is adequately comparable to that specified in quality, finish, design, efficiency, durability and general appearance, and has been elsewhere demonstrated to be serviceable for the purposes for which it is intended. If tests or demonstrations are required by the Owner's representatives, the cost of such tests or demonstrations shall be borne by the Contractor.

c. Contractor shall set forth the reasons to make the substitution and further state what difference, if any, will be made in the contract price for such substitution, should it be acceptable.

GS-19 EQUIPMENT AND SYSTEMS DEVIATIONS

a. The dimensions and ratings of equipment herein specified or indicated on the drawings are intended to establish the outlines and characteristics of equipment furnished by the particular manufacturer or manufacturers specified.

b. Where approved deviations require any redesign of the structure, partitions, foundations, piping, wiring, ductwork, etc., or redesign of any other part of the mechanical, electrical, or architectural layout, all such redesign and all new drawings and detailing required therefore shall be at Contractor's expense for the services which must be performed by the Owner's representatives at no cost to the Owner.

c. Where approved deviation requires a different quantity and arrangement of piping, wiring, ductwork, conduit, equipment, etc. from that specified or indicated on the drawings, furnish and install any such additional items required by the system, at no additional cost to the Owner.

GS-20 DRAWINGS AND INFORMATION REQUIRED

a. Prepare and submit detailed shop drawings for all of the ductwork, piping work, or other distribution services described herein, or which require close coordination with other work of this section and/or the work of other sections and existing conditions. In case of question, the Engineers will be the final word as to the requirement for shop drawings for specific areas of work.

b. Sheet metal shop drawings shall be at a minimum of 3/8" = 1'-0" scale. These shop drawings shall be used as the coordination drawings for all trades, especially for the sprinkler work, piping installation and major conduit runs.

c. "Record drawings" showing ductwork piping air outlets, fans, thermostats, etc. shall be submitted to Project Manager at completion of Project. See As-Built Drawings.

d. The work described in any shop drawing submission shall be carefully checked by this Contractor for all clearances (including those required for maintenance and servicing), field conditions, maintenance of architectural conditions and proper coordination with all Contractors on the job. Each submitted shop drawing shall include a certification that all related conditions on the job have been checked and that no conflict exists. No shop drawing submission shall be without such certification.

e. Submit to Engineer the electric wiring diagrams, automatic control diagrams and sequence of operation. The wiring diagrams must be complete and coordinated with the equipment actually installed.

f. All drawings, etc. shall be submitted sufficiently in advance of field requirements to allow ample time for checking and no claim for extension of the project schedule will be granted by reason of failure in this respect. All submittals shall be complete and shall contain all required and detailed information.

g. Submit manufacturer's data, catalog numbers, or shop drawings for equipment, materials, system components, etc., giving full information as to dimensions and adequacy of such items to meet and verify the requirements of the drawings and specifications.

h. If the submittals differ from the requirements of the construction documents, make specific mention of such difference in the letter of transmittal, with a request for substitution, together with reasons for same in order that, if acceptable, suitable action may be taken for proper adjustment. Otherwise, the Contractor will not be relieved of the responsibility for executing the work in accordance with the construction documents, eventhough conformance item not indicated in Contractor's submittal.

i. The processing of any submitted data or shop drawings for material, equipment, apparatus, devices, arrangements and/or layout, shall not relieve the Contractor from the responsibility of furnishing same of proper dimensions and weight, capacities, sizes, quantity, quality and installation details to efficiently perform the requirements and intent of the contract. Such processing shall not relieve the Contractor from responsibility for errors of any sort on the submitted data or shop drawings.

j. Submit to the Engineer one (1) sepia and five (5) prints of each drawing, including fabrication, erection, layout and setting drawings, and such other drawings as required under the various sections of the specifications until final approval is obtained. Submit five (5) copies of manufacturers' descriptive data for materials, equipment and fixtures, including catalog sheets showing dimensions, performance characteristics and capacities; wiring diagrams and controls; schedules; and other pertinent information as specified and required. Transmit final approved shop drawings to other Contractors affected by the work.

k. Make every effort to furnish all equipment of any equipment type (such as fans, motors, motor controls, pumps, valves, etc.) from one manufacturer.

GS-21 AS-BUILT DRAWINGS

a. Upon completion of installation, at Contractor's own expense, furnish two complete sets of as-built drawings. These drawings shall be submitted to the Owner for approval. After approval, they shall become the property of the Owner. Final payment will be withheld until receipt of the approved as-built drawings. As-built drawings constitute approved Contractor's shop drawings and manufacturer's equipment submittals.

GS-22 REMOVAL OF EXISTING EQUIPMENT

a. Make an accurate take-off all existing equipment, ductwork, piping, conduit, panelboards, wiring devices, and other accessories being removed during demolition and include the cost for disconnecting and removal of said equipment, etc. into the Base Bid. Removals shall be as specified and/or as indicated on the drawings. In certain cases, equipment or materials designated for removal shall remain the property of the Owner and shall be turned over at locations in the building as directed by the Owner.

b. A walk-through of the premises will be held during the bid period to indicate the extent of the removals (see "Demolition Work in these specifications).

GS-23 NAMEPLATES, CHARTS AND TAGS

a. Furnish and install laminated Bakelite, Lamicoid, or similar approved nameplates, screwed onto or close by every manual valve, automatic valve, pilot light, remote pushbutton, panel mounted switches, temperature and pressure gauges, etc. Also provide a nameplate for each control panel and other equipment enclosures. Dymo labels will not be accepted.

b. Nameplates shall not be less than 2-1/2" x 3/4" x 1/8" thick, white, 1/4", upper case, cored letters on black background, with beveled edges. Nameplates shall clearly identify each item of equipment such as name and number of the equipment shown on the contract drawings, or as approved by the Owner.

c. Finished coverplates for pushbutton, switches, indicating light or special outlets shall have the inscription engraved in contrasting 3/16" black letters.

d. Furnish and install on each valve a numbered 1" brass tag, secured to handwheel with metal chain link. Use square tags for plumbing work and round tags for heating and air conditioning work.

e. Furnish and install in Mechanical Equipment Room, where directed, a glass covered, valve chart listing each new valve in the room by system, function and number. This chart shall include all valves in the room furnished under this contract.

f. All charts shall be submitted in draft form for approval prior to final issue.

g. Stencil function and service on each new item of equipment in equipment rooms in 5" high black lettering on light background.

h. Pipe labels indicating service and direction of flow shall be applied at approximately 20 ft. intervals and near equipment and major branch connections.

GS-24 TEMPORARY LIGHTING AND POWER FOR INSTALLATION

a. Temporary lighting and power shall be provided under the Electrical section of these specifications by the Electrical Contractor.

b. Usage of permanent wiring systems and equipment for Contractors' temporary light and power requirements is permitted provided the size of the loads applied meets the requirements of New York City Code, and methods of use are approved by Owner.

c. Under the Electrical section, maintain temporary lighting and power system in good working conditions, including the relocation and reinstallation when required to avoid interference with the progress of the work. Install temporary light and power in each room constructed to provide working illumination until permanent lighting is installed and energized.

d. Owner will pay costs of electric energy consumed.

e. Temporary power and light shall provide facility for general lighting and portable hand tools and for welding machines.

f. All work in connection with temporary wiring shall be removed at the completion of work as required or as directed by the Owner under the Electrical section of the Specifications.

g. The temporary light and power circuit connections to the existing distribution system shall be organized in accordance with the main building service shutdowns (see attachment in the end or this section).

GS-25 ERRORS AND OMISSIONS

a. In order to discover and resolve and conflicts or lack of definition which might create construction problems, bidder verifies that:

1. "We have examined the drawings and specifications for work included. Except for the items described in the attached list, we have discovered no errors, omissions, impractical details, violation of laws, ordinances, rules and regulations of authorities having jurisdiction, or conflicts which would require deviations from the drawings and specifications." (List items for which clarification is necessary in attachment to Bid Quotation Form).

GS-26 GUARANTEE

a. All work performed under these construction documents shall be guaranteed by each Contractor against faulty and improper material and workmanship for a period of one (1) year from the date of final acceptance and/or beneficial use, whichever occurs first, by the Owner, except that where guarantees or warranties for longer terms are provided by manufacturers, such longer terms shall apply. At no additional cost to the Owner, promptly correct any deficiencies which occur during the guarantee period, all to the satisfaction of the Owner. Provide similar guarantees from subcontractors, manufacturers and suppliers.

b. Be responsible for all leaks in all new piping for a period of one (1) year from the date of completion of work under this contract. Repair at no expense to the Owner, all such leaks which occur after completion of this contract upon 24 hours' notice thereof by the Owner. Leaks which occur prior to the completion of this contract shall be repaired at once. Be responsible for any damage caused by such leaks and the repair thereof and reimburse the Owner for all such expenses incurred thereby.

c. All refrigeration compressors shall have a factory guarantee including parts and labor for five years total.

d. The final acceptance will be made after the Contractor has adjusted his equipment, balanced the various systems, demonstrated that it fulfills the equipment of the Drawings and Specifications, and has furnished all the required Certificates of Inspection and approvals.

GS-27 INSTRUCTION MANUAL

a. Submit to the Owner 5 copies of bound instruction manuals containing the following materials for all HVAC, Electrical and Plumbing systems:

1. Manufacturer's mechanical and electrical equipment parts list of all components of the systems listed on the equipment schedules, control diagrams and wiring diagrams of controllers. List shall give System No., Unit No., Manufacturer's Model No., and Manufacturer's Drawing No.

2. Step by step operating instructions for each system including preparation for starting, summer operation, winter operation, shutdown and draining.

3. Maintenance instructions for each type of equipment.

4. Possible breakdowns and repairs for each type of equipment.

5. List of nearest local suppliers for all equipment.

6. Manufacturer's literature describing each piece of equipment listed on the equipment schedules, control diagrams and wiring diagrams of controllers and a copy of the Air Balance Report.

7. As-installed control diagrams by the control manufacturer.

8. Description of sequence of operation by the control manufacturer.

9. Complete "as-installed" color coded wiring diagrams of all systems and all electrical motor controller connections and interlock connections of all other mechanical equipment.

10. Chart of the tag numbers, location and function of each valve.

11. Single line diagrams and riser diagrams as applicable.

GS-28 PERFORMANCE TESTS

a. Upon completion of the installation, test and balance all equipment and systems under field operating conditions to demonstrate its compliance with specification requirements.

b. Should any part of the system fail to meet the contract requirements, adjust, repair or replace all defective or inoperative parts and again conduct the complete performance tests.

c. Submit test reports to the Owner.

GS-29 ELECTRICAL EQUIPMENT AND CONTROLS

a. Supply electric motors, starters, and controls for all electrically operated and motor driven equipment furnished or supplied under respective specifications.

b. All electrical motor starters and unmounted motors shall be installed under Electrical specifications.

c. All electrical motors installed under respective specifications shall be wired up complete under Electrical specifications.

d. All electrical automatic controls furnished or supplied under respective specifications, whether or not specifically mentioned or shown on drawings, shall be wired up complete under the respective section of the work.

e. All separate disconnect switches and transfer switches on line side or motor starter shall be furnished under Electrical specifications.

GS-30 REMOVALS AND RELOCATIONS

a. All components or abandoned systems and abandoned portions of system to be removed are to become the Contractor's property and removed from the premises.

b. Where portions of systems noted for removal remain in use, permanently seal the point of disconnection so as not to interfere with system operation.

c. Items which are to be relocated shall be carefully removed, inventoried, and stored until needed for reinstallation. Clean and refurbish relocated item as appropriate to match new similar items.

d. Where interferences between existing system components and new work require relocation of the existing components to clear that interference, they may be reused, except where specifically noted to the contrary, providing that their condition is noted by the Owner's representative and they are approved by him as equivalent to new.

e. Where existing system components are required to be replaced, all new components shall be provided.

f. System components include all accessories, cables, controls, conduits, hangers, bases and supports and outlets.

g. Include in the bid the cost for the removal and/or relocation of all obstructions.

GS-31 TIME AND MANNER

a. As time is of the essence of this contract, furnish labor and materials in sufficient quantities and in ample time, do all expediting and scheduling of work required and so manage the operation that work will be completed within time stated in contract, plus any extensions thereof approved by Owner in writing. Should the work not be completed on or before the contract date, Owner reserves the right to direct the Contractor to leave the job during installation of Owner's equipment and to return and complete his work thereafter without any increase in cost to Owner.

b. Before undertaking the work, submit an outline and graphic schedule of proposed procedures for approval in order that Owner may plan for and accommodate necessary arrangements to permit work to be done. Progress schedule shall indicate anticipated times when work on each trade is expected to be started and completed. At least once a week, during construction period, schedule shall be revised and resubmitted to show dates when work of each trade actually was begun and completed and any extensions to original schedule approved by Engineer. It shall be submitted by means of a reproducible as specified for shop drawings.

c. Exercise care at all times to maintain cleanliness in operations, avoid fire and accident hazards and remove inflammable debris promptly. Keep premises clean of construction dirt, dust and debris and maintain conditions acceptable to Owner at all times.

d. It shall be the specific responsibility of the Contractor to advise his Subcontractors what responsibility each has in scheduling and performing his work to conform to established progress schedule and contract completion date. Subcontractors must be particularly advised, preferably in the terms of agreements entered into by and between them and Contractor, as to time when operation of chilled water system and other apparatus will be required and when all testing of mechanical equipment shall be done so as to have been completed in advance of final inspection to be held on or about contract completion date, and it shall be the further obligation of Contractor to see that the several Subcontractors cooperate fully with one another to that end.

SECTION 15000
HEATING, VENTILATING AND AIR CONDITIONING

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SECTION 15000
HEATING, VENTILATING AND AIR CONDITIONING

HV-1 GENERAL

a. All work in this section is subject to General and Supplementary Conditions of these Specifications.

b. Work and materials shall comply with applicable provisions of the New York City Building Code and the Building Rules and Regulations for these premises.

HV-2 SCOPE OF WORK

a. Include all labor, materials and equipment required for the furnishing, installing and testing, complete and ready for operation in a manner satisfactory to the Owner, all herein specified, including, in general, the following:

1. Removals
2. HVAC equipment
3. Piping
4. Ductwork
5. Insulation
6. Air Balancing/Water Balancing
7. Vibration Isolation
8. Automatic Controls
9. Controlled Inspection
10. Equipment Use Permits

HV-3 REMOVALS

a. Removals shall include but not be limited to portions of existing piping and ductwork which are not intended to be reused.

b. In addition to the above requirements, refer to General Conditions for DEMOLITION and REMOVALS.

c. Cap and seal any openings in existing piping and/or ductwork not intended for reuse.

HV-4 HVAC FIRST YEAR MAINTENANCE

a. Provide an alternate price for HVAC maintenance on all equipment installed by the HVAC contractor for one year following the date of Substantial Completion.

b. Service Times:

1. Regular maintenance Monday through Friday, 8:30 a.m. - 4:30 p.m., except holidays

2. Emergency service 24 hours per day, 365 days per year within two hours of receipt of call on equipment utilized on a 24 hr per day basis.

c. Included Services:

1. Filter maintenance, strainer maintenance, lubrication and inspections

2. Repairs resulting from power failures or power surges.

3. Recovery of refrigerant and use of approved refrigerant storage devices under the Federal Clean Air Act (or similar laws and regulations) when servicing the equipment.

4. Air freight and expediting costs incurred in order to make emergency repairs of 24 hour equipment.

5. 24-hour central station monitoring of Computer/Telephone Room temperature and power outage and equipment failure of all 24 hour equipment. (Provide separate price for service).

d. Inspect each piece of equipment once per month for one year following the date of Substantial Completion.

1. During each inspection perform the following services:

a) Check the operation of all equipment and its conditions
b) Furnish and install new filters
c) Lubricate all fan and motor bearings and all moving parts as needed
d) Check all belts and drives and make necessary adjustments
e) Furnish and install fan belts as needed
f) Check and clean condensate pumps and float assemblies
g) Flush and clean drain lines with high pressure CO2 gas
h) Check and clean condensate pans
i) Check operation of all heaters
j) Check and clean humidifiers
k) Check and clean water strainers at AC unit locations
l) Check and calibrate thermostats and automatic temperature controls
m) Check all equipment electrically and mechanically
n) Check all motor amperage for possible overloads
o) Visual check for refrigerant leaks

HV-5 PIPE AND PIPE FITTINGS

a. General: Provide piping work in accordance with the Contract Documents. Uninsulated piping in exposed areas shall be cleaned and painted with rust-proof primer. Finish coat shall be applied in ANSI Standard color or as selected by Owner.

b. Except as modified by local governing codes and the Contract Documents, comply with the applicable provisions and recommendations of ANSI, ASTM, ASME and AWS.

c. In general, for welded piping, branch takeoffs from pipe mains shall be made with standard welding tees. Weldolet type reinforced branch connection fittings may be used at the Contractor's option on branch sizes at least one standard pipe size smaller than the size of the main pipe.

d. Steel piping 2-1/2" and smaller shall have threaded connections, except as otherwise specified. Steel piping 3" and larger shall have welded connections.

e. Copper Piping: Soldered joints with 95-5 tin/antimony solder for coil condensate and drains.

f. Dielectric Pipe Union: As manufactured by Hart Dielectric Union Model D-3136-V-CS1B. Provide dielectric fittings at junction of dissimilar metals: Copper, steel, cast iron, brass, bronze and stainless steel.

g. Piping Materials:

Service	Size	Material	Type	Weight	Rating (psig)
Chilled Water	All	Steel, A53	Black	Sch 40	300
Hot Water	For induction units refer to PA Standards				
City Water	All	Copper, B88	Rigid	Type TP	125
Coil Condensate	All	Copper, B88	Rigid	Type L	125

h. Pipe Unions: Cast iron or bronze body, screwed, ground joint, brass seats; 300 psig for pipe 2" and smaller.

i. Pipe Flanges: ANSI B 16.5 and ASTM A-181 welding neck. Use on welded pipe for unions and at valves. Facing on flange shall match facing on equipment (flat or raised face). Studs shall be of carbon steel. Flanges shall be of the same pressure rating as the fittings and valves in each service category.

j. Piping Installation: Piping shall be installed in neat workmanlike manner with multiple pipes run in parallel banks which are properly pitched and routed parallel and perpendicular to building features. Valves, strainers and gauges and other appurtenances shall be readily accessible for service. Coordinate with other trades and relocate items as needed for final coordinated assembly.

k. Pipe Sleeves:

1. Provide for all pipes passing through floors, walls, partitions, concrete beams and girders and sleeves, types as scheduled below, of adequate diameter to allow a minimum of 3/4" clear all around between sleeve and pipe. When piping is required to be insulated, insulation shall pass continuously through the sleeve with 1/2" clearance between insulation and sleeve.

2. Non-Fire Rated Walls & Floor Penetrations: Sleeves shall be Pipe Shields, Inc. "Adjust-To Crete", or approved equal, 24 gauge minimum galvanized sheet metal as scheduled below. "Adjust-To Crete" figure No. used for reference:

Drywall	#11
Concrete or masonry walls & concrete beams	#100
Concrete floors	#10
Concrete floors with metal underdeck (tack well to deck)	#2

3. Fire Rated Wall & Floor Penetrations: All pipes penetration fire walls and floors shall be encased in adjustable or fixed length metal cans, minimum 24 gauge, sized for maximum 1" spacing between insulation and can. Insulation shall consist of 360 waterproof calcium silicate insert sized to extend to a minimum of 1" beyond wall or floor penetration. Calcium silicate insert shall be same thickness as the adjoining pipe insulation. Spacing between shield and can shall be packed on either end with double neoprene coated rope positively fastened.

l. Floor and Ceiling Escutcheons:

1. On all exposed pipes passing through floors, walls, partitions, plaster furring, etc., provide 1" split-type steel plates. In finished rooms, plates shall be nickel-plated; in unfinished rooms, plates shall be prime coated. Plates shall be similar to Grinnell No. 10.

m. Hangers, Anchors and Concrete Inserts:

1. Furnish and install suitable and substantial hangers, anchors, inserts and supports for all piping as specified herein, and as required. Submit locations for all supports and hangers. All figure numbers indicated herein are Grinnell Co. or as approved.

2. *Horizontal copper piping shall be supported in accordance with the following schedule:*

Pipe Size	Rod Diameter	Maximum Hanger Spacing
1" & smaller	3/8"	6'
1-1/4" to 2"	3/8"	9'
2-1/2" to 4"	1/2"	10'
6" and larger	1/2"	12'

3. Horizontal steel piping shall be supported in accordance with the following schedule.

Pipe Size	Rod Diameter	Maximum Hanger Spacing
1" or smaller	3/8"	6'
1-1/2" to 2"	1/2"	9'
2-1/2" to 3"	1/2"	11'
4"-5"	5/8"	14'
6"	3/4"	17'
8" and larger	1"	18'

4. No piping shall be hung from other piping, service, or ceiling hangers. In no case shall hangers be supported by means of vertical expansion bolts. Hangers for piping which supports in-line pumps shall be provided with vibration isolators to minimize vibration transmission to building structure.

5. Furnish and install approved roller supports, floor stands, wall brackets, etc. for all lines running near the floor or near walls, which can be properly supported or suspended by the floors or the walls. Pipe lines near walls may also be hung by hangers carried from approved wall brackets at a higher level than the pipe. Grinnell Co. pipe rolls Fig. 181, and wall brackets Fig. 195.

6. Hangers shall be heavy construction suitable for the size of pipe to be supported. Hangers for pipes up to and including 5" shall be adjustable wrought clevis type. Hangers for any trapeze assembly shall consist of two rods and cross-bar with pipe roll complete with adjustable sockets and nuts. Where hanger rods extend below 7 feet A.F.F., they shall be protected from causing head injuries or replaced with clevis hangers. Clevis hangers Fig. 260, ring hangers Fig. C1-97.

7. Piping secured to strut channels (Kindorf, Unistrut, etc.) shall be clamped with cushioned clamp assembly similar to Hydra-Zorb cushion clamps (Jarett Industries, Inc., NJ 201-539-4410). Clamp assemblies shall allow pipe and tube sizes to be intermixed on variable centers as needed to conserve space and to allow for addition or removal of tube or pipe without unclamping other elements.

   Cushions shall be of resilient material; resistant to oils, hydraulic fluids, grease, fuels, common solvents, salt solutions, dilute bases and mineral acids; and not degrade at operating temperatures of 250 F. Cushions shall perform the additional function of providing a thermal break between the pipe and the metal clamp.

n. Expansion Joints and Bends:

1. Piping shall be installed in such a manner as to allow for thermal expansion and contraction without excessive strain to connections at equipment or interconnecting piping.

2. Unless expansion joints are specifically shown, pipe expansion, in general, is to be absorbed in bends, swing joints, and offsets as required. Piping mains, branches, and runouts shall be so installed as to allow for free expansion and contraction without developing leaks or undue stressing of pipe. Stresses shall be within allowable limits of ANSI Code B31.11 for Pressure Piping. Submit engineering data.

HV-6 CLEANING OF PIPING

a. Plug open ends of piping, valves and equipment except when Work is being performed. Protect connections to equipment and control valves with temporary screens and flush piping with water. Remove dirt and debris collected.

b. Thoroughly clean new piping to remove organics, rust, and foreign matter.

c. Perform chemical cleaning after successfully completing pressure and leakage tests and thoroughly flushing the systems.

d. Use cleaning agents which will not interact with any of the materials in the systems in any way to produce corrosion, form deposits, weaken, reduce the life or in any way have a detrimental effect on any system components.

e. Fill the system with clean water and add sufficient cleaning preparation to provide a concentration adequate to perform complete cleaning. Add the cleaning preparation at a point which will assure good mixing.

f. Provide temporary containers to accommodate the foam that may form and temporary pumps to circulate the chemical solution.

g. Circulate the mixture of cleanser and water for a sufficient length of time to complete the cleaning.

h. Drain the system, flush with clean water, clean permanent strainers and screens, remove temporary screens, and refill the system.

i. Cleaner for the new piping shall be Nalprep 330 as manufactured by the Nalco Chemical Co. or the approved equal.

j. The entire cleaning operation shall be performed by a competent water treatment service organization in strict accordance with the manufacturer's recommendations. Provide written certification after the cleaning operation is completed.

k. Obtain clean water approval from Building Management by submitting water sample and certificate. Begin circulation of building/tenant system within 5 days of treatment.

HV-7 PIPE SYSTEM PRESSURE TESTS

a. Test all piping except drainage connections, including valves, fittings and joints hydrostatically at a pressure equal to at least 1-1/2 times the rated pressure, but no less than 200 psig for a minimum of four (4) hours. Blank off or remove elements or equipment which may be damaged by the pressure. Open but do not back seat valves. Inspect all joints and connections. Confirm no visible leakage and negligible drop in pressure.

b. Repair leaks in accordance with the following procedures. In each case, a retest shall be necessary after repairs are made.

1. Soldered/Brazed joints: Remove solder/brazing alloy and reapply with proper flux.

2. Flanged/Grooved end Joints: Check to determine that all bolts are uniformly tightened with the required torque. If leak persists, depressurize the line, remove gasket, examine flange/grooved end faces, and insert new gasket.

3. Threaded Joints: Tighten joint to a reasonable torque. If leak continues replace pipe and/or fittings. Do not use pipe dope or cement to stop pipe leaks.

4. Leaks in Material: Leaks located in pipe material shall require the replacement of that section of pipe.

HV-8 WELDING

a. General: All welding shall conform to the following procedures for metallic arc welding of steel pipe, fittings, and flanges under provisions of ANSI B31.1 Piping Code and paragraph B-112 of ASME Boiler Construction Code. All welders shall be identified, and shall be qualified for the type of welding under this Contract, and certified per API Std. 1104-1977 or ANSI/ASTM BPV-1X-1980.

b. Process: All welding shall be done by the metallic arc process and all welds are to be butt welded.

c. Filler and Base Metal: Material shall conform to the Specifications of ASME Boiler Construction Code.

d. Position: Welding shall be done with the axis of the pipe in the horizontal rolled, horizontal fixed, and vertical fixed positions, as defined by the Codes referred to above.

e. Preparation of Base Materials: The edges or surfaces of the parts to be joined by welding shall be prepared by machining, flame cutting, chipping or grinding, or a combination of these, to shape as shown in detail in the applicable Code, and shall be cleaned of all slag, oil, grease, and excessive amounts of scale or rust. Use of backup ring shall be optional.

f. Nature of Electric Current: Welding current used shall be direct current. Base material shall be on the negative side of the line.

g. Welding Techniques: Welding techniques, number of beads and sequence, diameter or electrodes for each bead, and the mean amperage and voltage values during welding for each bead, shall be as approved. Layers in horizontal pipe welds shall be limited to approximately 3/4" width.

h. Cleaning: All slag or flux shall be removed from each crater by means of a light cleaning hammer before proceeding with the next electrode. Each completed bead or layer shall be thoroughly cleaned with a hammer and wire brush, removing all weld splatter, from pipe ends or surface of weld before laying down the next successive bead or layer.

i. Defects: Any cracks or blow holes that appear on the surface of any bead of welding shall be removed by chipping, grinding, or flame gouging before depositing the next successive bead.

HV-9 VALVES

a. General: Provide valves of type and size as shown on the Drawings and as specified herein and as may be necessary for isolation, balancing and maintenance of piping distribution systems and equipment. Valves shall be of minimum working pressure and materials as pipe fittings specified for the service.

b. Plug Valve: Use as combintion balancing and shut-off valve shall be the eccentric non-lubricated type with adjustable memory stop and pressure tap, as manufactured by DeZurik. Rated working pressure and hydrostatic testing pressure (one and one-half times of rated working pressure) must be specified.

For Work Pressure from 200 psig through 450 psig:

1. Size 2 in. and under, DeZurik Series 100, Fig, 120/WG/SP, screwed, carbon steel conforming to ANSI Class 300.

2. Size 2 1/2 in. and up, DeZurik Series 100, Fig. 128 DFX001, flanged, carbon steel conforming to ANSI Class 300.

c. Ball: Use for shut off services for sizes 3" and below for non corrosive service. Extended stems and handles shall be provided on insulated piping systems to coordinate with insulation thickness. Ball valves for 250 psig service and below shall be provided with bronze bodies, stainless steel ball, stem and seat ring, TFE bushing and ring gasket. Ball valves rated above 250 psig shall be carbon or 316 stainless steel body with 316 stainless ball.

d. Butterfly: Use for shut off only for sizes 4" and above for non corrosive service. Butterfly valves shall be of the bi-directional lug type, ANSI Class 150, 250 or 300 depending upon service. Mating pipe flange shall be weld neck type. Gear operators shall be provided on manual valves 4" size and larger. Iron body, 316 stainless steel disc, DeZurick or as approved.

e. Ballcentric: Use at return pipe of each water coil, heat exchanger, cooler, and condenser. Use at discharge pipe of each pump, and at each water system return riser and branch pipe off main pipe for isolation usage and minor balancing. Ballcentric valves shall be of the eccentric non-lubricating type as manufactured by DeZurik, Homestead, Nordstrom, or as approved. Water working pressure rating shall match installed piping service rating. Valves 8" size and smaller should be semi-steel construction and equipped with gear operator for size 6" and larger.

f. Silent Check: Use at pump discharge for chilled, condenser, glycol, and hot water systems. Water working pressure rating shall match installed piping service rating. Valves 2-1/2" size and larger shall be iron body, bronze trim; size 2" and smaller shall be semi-steel with bronze trim. Valves shall be manufactured by Mueller, Williams-Hagen, Smolensky, or as approved.

g. Wye Strainers: Strainers shall be the same size of pipe lines in which they are installed. Strainer bodies shall be bronze for copper piping systems and cast iron for steel piping systems with bottoms drilled and plugged. The bodies shall have arrows clearly cast on the sides to indicate the direction of flow. Each strainer shall be equipped with an easily removable cover and sediment basket. The basket shall be made of monel, not less than 0.025" thick (22 gauge), with approved size perforations of sufficient number to provide a net-free area through the basket of at least four times that of the entering pipe. The flow shall be into the basket and through the perforations. The basket shall seal against machined seat both in the body, and at the lap. The lap shall have a gasket seal between it and the strainer body. Strainers shall be as manufactured by Bailey, Illinois, Crane, Mueller, or Warren Webster. Provide valved blow-off with threaded hose connections at each strainer outlet, size to match strainer taps. Body pressure ratings shall be in accordance with working pressure for systems of this Section. Water systems: 3/16" perforations.

HV-10 COIL CONDENSATE PUMPS

a. Vertical type pumping unit with high impact polystyrene tank, ABS motor, tank cover, volute and impeller. Thermally protected motor with stainless steel shaft.

b. Pump assembly shall be UL listed and equipped with sanp action mercury float switch, 6 feet cord, 115 volt plug (unless otherwise noted) and safety switch.

c. Provide high level switch and contacts for external alarm controls.

d. Pump shall be Tecumseh Little Giant VCL-24UL or reviewed equivalent.

HV-11 TEMPERATURE GAUGES

a. Temperature gauges shall be of the adjustable socket, mercury-in-glass type, with 9" Fahrenheit scale, of proper range for the service, enclosed in metal, glass covered case, with magnified mercury columns, separable wells, straight or angle-mounted as required, and installed in piping systems in such a manner as to be easily read. Provide extension necks where required to clear insulation.

b. Thermometers shall be manufactured by, Weiss, Trerice, Weksler, or as approved.

c. Provide as follows:

1. Chilled water supply and return at fan-coil units
2. Chilled water supply and return at CAC units
3. Chilled water supply and return at building riser connections
4. Where indicated on the Drawings

HV-12 PRESSURE GAUGES

a. Polished brass case and ring, heavy glass dial face, dial range 150 - 200% of normal working pressure (psig), and 1/4" NPT bottom pipe connection fitted with 1/4" brass cocks and pulsation dampener. Steam pressure gauge assembly shall include pigtail stem.

b. Pressure gauge shall be as manufactured by Weiss, U. S. Gauge, Weksler, Trerice, or as approved.

c. Provide as follows:

1. Chilled water supply and return at fan-coil units
2. Chilled water supply and return at CAC units
3. Piping connections to building risers
4. Where indicated on the Drawings

HV-13 WATER SYSTEM BALANCING

a. Provide necessary piping and connections for balancing all water systems. Operate water systems at full flow and perform necessary adjustments and balancing to deliver water quantities to system components as scheduled on the Drawings.

b. Water system balancing shall be performed by Contractor's representative or accepted balancing firm. Submit evidence of qualifications. Water tests and balancing operations shall be conducted in the presence of the Owner's representative.

c. Contractor shall submit water balancing data sheets and reports which tabulate test data of final adjusted system conditions including design quantities for all water system components. Tabulation shall include measured quantities and calculated quantities which are derived from the measured readings including flow rate in GPM, and inlet and outlet pressures.

d. Specified flow measuring devices shall be used for obtaining flow rates in main piping. For other sections of piping system, pressure gauge readings shall be obtained from balancing then tabulate flow rates from pressure readings.

e. Provide automatic air vents at all local high points of water systems and plug after systems have been initially purged and placed in operation.

HV-14 INSULATION, PIPING

a. Fire Resistance Rating:

1. All insulation, vapors barriers, adhesives, mastics and related material shall be of non combustible materials to meet Code, and with UL flame spread rating of 25 maximum and smoke developed rating of 50 maximum.

2. Adhesives and mastics ratings shall be based on test of bulk material to meet Code, and a maximum burning in accordance with RS14-11, ASTM-E84 Test Methods.

b. Manufacturers:

1. Insulation Manufacturers: Johns-Manville, Owens-Corning, Gustin Bacon, Armstrong, or as approved.

2. Adhesive Manufacturers: Benjamin Foster, Insul-Coustic, Minnesota Mining, Tuff-Bond, Zeston,. or as approved.

c. Thermal Resistance "R" Rating: Minimum insulation thickness specified herein are based on R rating of 4.0 per inch of thickness on a flat surface at a mean temperature of 75 F. The minimum insulation thickness shall be increased for materials having R rating less than 4.0, or may be reduced for materials having greater 4.0 in accordance with Energy Code determinations. Minimum density 4 lbs. per cubic foot.

d. Fibrous glass insulation shall be used for all piping work except where otherwise specified. Pipe covering shall be sectional molded fibrous glass, snap on installation, with all-service jacket meeting flame resistance ratings of the Code, UL, and NFPA. Blanket fibrous materials shall be used for fittings and valves.

e. Pipe Connections: Butted insulation sections shall be joined with 4" fire retardant vapor barrier strips and adhesive similar to Benjamin Foster 30-35, or as approved. Minimum 2" overlap.

f. Concealed Fittings and Valves: Blanket type insulation with Foil Scrim Kraft (FSK) facing. Seal ends with Benjamin Foster 30-35 and 30-36 for hot piping or as approved. Premolded fiberglass secured in place with 16 gauge copper plated steel wire. Cover with trowelled-on mastic.

g. Exposed Hot Fittings and Valves: Blanket type insulation with mastic covering or Johns-Manville Zeston PVC fittings. Seal ends with Benjamin Foster with 30-36 or as approved.

h. Exposed Cold Fittings and Valves: Blanket type insulation with mastic covering or Johns-Manville Zeston PVC fittings. Seal ends with Benjamin Foster with 30-35 or as approved.

i. Minimum Thickness (Based on R = 4.0 per inch Rating)

System	Pipe Size	Minimum Thickness
Chilled Water	All	1"
Coil Condensate	1" & less	1/2"

HV-15 INSULATION, DUCTWORK

a. Scope:

1. Insulation shall be applied to:

   Supply ductwork

2. Supply ductwork insulation thickness may be reduced on lined ductwork by an amount equal to the lining thickness.

3. Insulate sections of existing ductwork which are disturbed by the work of this project.

4. Insulation shall be installed after pressure tests are completed and accepted.

b. Fire Resistance Rating:

1. All insulation, vapors barriers, adhesives, mastics and related material shall be of non combustible materials to meet Code, and with UL flame spread rating of 25 maximum and smoke developed rating of 50 maximum.

2. Adhesives and mastics ratings shall be based on test of bulk material to meet Code, and a maximum burning in accordance with RS14-11, ASTM-E84 Test Methods.

c. Manufacturers:

1. Insulation Manufacturers: Johns-Manville, Owens-Corning, Gustin Bacon, Armstrong, or as approved.

2. Adhesive Manufacturers: Benjamin Foster, Insul-Coustic, Minnesota Mining, Tuff-Bond, Zeston, or as approved.

d. Thermal Resistance "R" Rating: Minimum insulation thickness specified herein are based on R rating of 3.5 per inch of thickness on a flat surface at a mean temperature of 75 F. The minimum insulation thickness shall be increased for materials having R rating less than 4.0, or may be reduced for materials having greater 4.0 in accordance with Energy Code determinations. Minimum density 4 lbs. per cubic foot.

e. Concealed Ducts: Flexible fibrous glass insulation, 1½" thick, 3/4 lb. minimum density with reinforced aluminum foil-faced flame resistant vapor barrier factory applied similar to Johns-Manville "Microlite" FSK. May be used for circular ducts in exposed areas. Rigid insulation as specified below may be used for concealed ducts. Wrap insulation tightly on duct but not excessively compressed at corners. Adhere to duct with 2/3 average of BF-85-20 adhesive in 4" wide bands, 8" on centers. Fasten all joints and seams with flare type staples on 4" centers. Seall all punctures of vapor barrier with pressure sensitive tape matching facing material. Support insulation on the bottom side of ducts over 24 inches with weld pins and speed washers approximately 18" on centers.

HV-16 VIBRATION ISOLATION

a. General: Provide vibration isolation for equipment as listed in the Isolation Selection Guide found at the end of this section. All equipment shall be mounted on or suspended from approved foundations and supports.

b. The work in this section includes the following:

1. Vibration isolation elements for equipment

c. Submittal Data Requirements:

1. Submittals

a) Catalog cuts or data sheets on specific vibration isolators to be utilized detailing compliance with the specification including specification reference "TYPE" described in this specification.

b) An itemized list of all isolated equipment with detailed schedules showing isolators proposed for each piece of equipment, referencing material and isolation drawing numbers.

c) Drawing showing construction for equipment; include dimensions, structural member sizes and support point locations.

d) Indicate isolation devices selected with complete dimensional and deflection data before condition is accepted for installation.

d. Manufacturer of vibration control equipment shall have the following responsibilities:

1. Determine vibration isolation sizes and locations.
2. Provide equipment vibration isolation as specified.
3. Guarantee specified isolation system deflections.
4. Provide installation instructions, drawings and field supervision to insure proper installation and performance of systems.
5. Certify correctness of installation upon completion.

e. Devices: All vibration isolation equipment shall be the product of a single manufacturer. Products other than listed below are acceptable provided their systems strictly comply with intent, structural design, performance and deflections of the listed products.

f. Manufacturers: Vibration isolation manufacturer shall be one of the following or as approved:

Vibration Mountings & Controls, Inc., Bloomingdale, NJ	(V.M.C.I.)
Mason Industries, Inc,, Hollis, NY	(M.I.I.)
Vibration Eliminator Co., Long Island City, NY	(V.E.C.)
Kinetics Noise Control, Inc., Dublin, OH	(K.N.C.)

g. Isolators: The theoretical vertical natural frequency for each support point, based upon load per isolator and isolator stiffness shall be out of resonance with equipment forcing frequencies or support structure natural frequency.

h. Corrosion protection for both indoor and outdoor applications shall be as follows:

1. Springs: Zinc electroplated or powder coat
2. Hardware: Zinc electroplated
3. All other metal parts: Zinc electroplated, powder coat, hot spray or hot dipped galvanized

i. Isolator Product Types:

1. TYPE F: Combination Spring/Elastomer Hanger Isolator.

a) Spring and neoprene elements in a hinged steel hanger box with the features as described for TYPE C and E isolators.

b) Type "F" isolators shall be one of the following or an approved equal:

1)	Type RSHN or SANSH	V.M.C.I.
2)	Type 30N	M.I.I.
3)	Type SNRC4	V.E.C.
4)	Type SRH	K.N.C.

2. TYPE G: Pad type elastomer isolator

a) Neoprene pad shall have 0.75" minimum thickness and shall have opposed cylindrical supports spaced on one inch centers to provide uniform deflection of 0.1 inch under rated load. Supports shall be connected in the center by an 1/8" tear strip to facilitate trimming to desired size in one inch increments. Supports will also have thru holes to accept up to 3/8" bolts without special drilling or coring.

b) 1/16" galvanized steel plate between multiple pad layers.

c) Load distribution plate where attachment to equipment bearing surface is less than 75% of the pad area.

d) When bolting is required for wind load compliance, neoprene and duck washers and bushings shall be provided to prevent short circuiting of bolt.

e) Type "G" isolators shall be one of the following or an approved equal:

1)	Type NP	V.M.C.I.
2)	Type Super W	M.I.I.
3)	Type NGD	K.N.C.

j. Equipment Bases:

1. TYPE B-7: Computer Room Unit Base

a) Computer room air conditioning units shall be welded or bolted to welded structural steel stands.

b) Stand shall have + 1-1/2" of leveling adjustment.

c) Type "B-7" shall be one of the following or an approved equal:

1) Type CRFS (non-isolated) or ASCM (isolated) V.M.C.I.

k. Installation, General

1. Isolation systems shall be installed in strict accordance with the manufacturer's written instructions and all submittal data.

2. Vibration isolators shall not cause any change of position of equipment resulting in stress on equipment connections.

l. Equipment Installation

1. Equipment shall be isolated as indicated in the Isolation Selection Guide at the end of this section.

m. Inspection: Upon completion of installation of all vibration isolation devices, a certification report prepared by the manufacturer shall be submitted in writing to the contractor indicating that all systems are installed properly and in compliance with the specifications. The report must identify those areas that require corrective measures or certify that none exists.

n. Vibration Isolation Selection Guide for Equipment:

Equipment	Mounting Type	Static Deflection
Suspended Fans	F	1-3/8"
Suspended Fan Coil Units	F	1-1/2"
Floor Mtd CAC Units	B-7	1-1/2"
Suspended CAC Units	F	1-1/2"
Condensate Pumps	G	0.10"

HV-17 TECHNOLOGY ROOM AC UNITS, CEILING MOUNTED, CHILLED WATER (CAC-3)

a. Provide packaged integral self-contained AC units with capacities as scheduled on the Drawings. Units shall be suitable for ducted applications and shall be provided with a factory installed 2-way chilled water regulating valve rated for 350 psig. Coil shall be rated for 350 psig working pressure.

b. The cabinet and access panels shall be fabricated from aluminum for corrosion protection and to minimize the system's weight. Panel acoustic lining shall be 2 lb/ft^2 high density sound and thermal insulation and sealed with self-extinguishing gasketing conforming to NFPA 90A and 90B.

c. Control circuit shall be 24 VAC Class II including primary and secondary circuit protection. A condensate pan water level switch shall alarm the system if an overflow condition is sensed. The unit shall continue to operate. Low voltage, high voltage and grounding wires shall be color coded and individually numbered at each end for ease of service tracing.

d. Unit shall be configured for a draw thru air pattern to provide uniform air distribution over the coil face. The coils shall be constructed of seamless drawn copper tubes, mechanically bonded to tempered aluminum fins with a 2-cycle sinusoidal fin design for maximum heat transfer. Coil end plates shall be hot dipped galvanized. Cooling coil shall mounted in an insulated stainless steel condensate pan.

e. The blower shall be direct driven with double width, double inlet housing and forward curved blades. Blower shall be dynamically and statically balanced to minimize vibration and operate in the Class I range. Blowers shall be corrosion protected with a painted housing and impeller wheel. The three speed evaporator motor shall be factory wired for the correct speed to produce the specified air quantity.

f. Filters to be 2" deep, 30% efficient, throwaway. Provide one set of spare filters for each unit.

g. Controls shall be microprocessor based with an LCD display of operating status and alarm display. Controls shall be suitable for remote wall mounting (25 ft. cable). Provide an audible and visual alarm for the following field adjustable conditions:

High temperature
Low temperature
High humidity
Low humidity
Loss of air flow
Condensate pan full
Dirty filter

h. Accessories shall include:

1. Unit-mounted smoke detector
2. Control Transformers
3. System auto restart
4. Controls contacts for unit shut-down/start-up
5. Five-year extended compressor warranty
6. Two sets of 24 VAC common alarm terminals
7. Two-way, 350 psig chilled water regulating valve

i. Acceptable manufacturers: Air Technology Systems or reviewed equivalent.

HV-18 TECHNOLOGY ROOM AC UNITS, FLOOR STANDING (CHILLED WATER) (CAC-1 &2)

a. General: Provide Computer Room type package chilled water air conditioning units in accordance with the Contract Documents and to include:

1. All self-contained factory wired controls.

2. Complete assembly including motors, chilled water cooling coil, electric reheat coil, infrared humidifier, supply fan, filters, all necessary accessories and controls, interconnecting piping, and wiring assembled within a finished cabinet.

b. Standards and Codes

1. Except as modified by governing codes and by Contract Documents, comply with the applicable provisions and recommendations of New York City Building Code, MEA, ETL, ASHRAE and UL.

c. Submittals

1. Shop drawings indicating size, type, location, details and installation requirements. Confirm MEA, ETL and UL listing.

2. Product Data: Manufacturer's printed data, catalog cuts, test data, manufacturer's recommendations.

d. Acceptable Manufacturers: Air Technology Systems or reviewed equivalent.

e. Product Description

1. Cabinet and Frame: Custom painted steel panels with 1", 1-1/2 lb. insulation. A hinged front access panel shall open to a second dead front panel protecting high voltage components. Frame shall be constructed of 14 gauge heliarc welded tubular steel. Color shall be per the selection of the Architect and the Owner.

2. Chilled water cooling coils shall be of A - frame design and constructed of copper tubes and aluminum fins. The entire coil assembly shall be mounted in a stainless steel condensate drain pan. Coils rated at 400 psig.

3. Filter Chambers: Shall be an integral to unit, located within cabinet, serviceable through side door of unit. Filters shall be pleated 2" with a minimum efficiency rating of 30% based on ASHRAE Standard 52-76.

4. Electric Reheat Coils: Shall be low watt density, rugged finned tubular construction, protected by thermal safety switches and provide three stages of non-ionizing reheat with maximum sheath temperatures below 420°F.

5. Infrared Humidifier: Shall be of infrared type with high quartz lamps mounted above a stainless steel humidifier pan. Humidification system shall use bypass air to prevent over-humidification. Humidifier shall be equipped with an automatic water supply system and programmable automatic flush control.

6. Fan Section: Shall be centrifugal type, double width, double inlet and shall be statically and dynamically balanced as a completed assembly to a maximum vibration level of two mils in any panel. Shaft shall be heavy duty steel with self-aligning ball bearings with a minimum life span of 100,000 hours. Drive package shall be two-belt, variable speed, sized for 200% of the fan motor horsepower. Self-aligning ball bearings and tubular steel fan shafts shall be provided on 5 HP fans or larger for longer system life.

7. System Controls

a) System Control Processor shall be microprocessor based and allow programming of temperature and humidity setpoints, alarm parameters, provide monitoring of operational status and maintain a database of room conditions and environmental system operational status.

b) Control system shall allow programming of the following room conditions:

Temperature Setpoint (65-85°F.)
Temperature Sensitivity (+1-+5 in 0.1°F. increments)
Humidity Setpoint (40-60% RH)
Humidity Sensitivity (+1-+10% RH in 0.1% increments)

c) All setpoints shall be adjustable from individual unit monitor panel or a site monitoring device.

d) Temperature and Humidity Sensors shall be capable of being calibrated using monitor panel controls.

e) All electronic circuitry shall be provided with self-diagnostics to aid in troubleshooting. Each printed circuit board shall be diagnosed and reported as pass/not pass.

f) The microprocessor shall include a monitor panel to display operational status alarms and permit calibration and programming of operation parameters. All indicators shall be in language form. No symbols or codes shall be acceptable.

g) Alarms: The microprocessor shall activate an audible and visual alarm in the event of any of the following conditions:

High Temperature
Low Temperature
High Humidity
Low Humidity
Loss of Air Flow
Change Air Filters
Water in Auxiliary Drip Pan

8. Accessories:

a) Acoustically lined cabinet and fan deck.

b) Two-way 24-volt, low voltage modulating chilled water regulating valve (rated at 400 psig water pressure). Valve shall be normally closed with spring-return.

c) Condensate pump with integral float switch, pump and motor assembly, and receiver

d) System auto restart

e) Non-locking type disconnect switch

f) Remote shutdown terminals

g) Two sets of 24 VAC common alarm terminals

h) Microprocessor control

i) Top discharge plenum box configured for adjustable three-way blow

j) Humidifier/reheat lockout terminals

k) One set of spare filters per unit

l) Five year extended compressor warranty

m) Upflow configuration with front air return

n) On/Off status auxiliary contact

o) Unit-mounted smoke detector

p) Adjustable floor stand (7½" high±)

9. Installation and Supervision

a) Units shall be installed in accordance with manufacturers recommendation. Manufacturer's representative shall supervise start-up and field testing.

10. Instructions

a) Provide a minimum of 4 hours of operating instruction to Owner at a time directed by the Owner's representative.

HV-19 INDUCTION UNITS (EXISTING)

a. Clean existing induction units during the final stages of construction. Remove construction debris, vacuum housing, brush coils and brush nozzle openings to restore full capacity. Clean permanent inlet screens.

b. Note any missing or ill fitting items, check thermostat operation and report any repair requirements to the engineer and building management.

HV-20 INDUCTION UNITS

a. Refer to drawings for types and capacities.

b. All new induction units to be purchased from the Port Authority.

c. Protect from any harm all new induction units and store in a safe location during the construction phase.

HV-21 FAN COIL UNITS

a. Casing shall be fabricated of 16 gauge pre-painted galvanized steel with provisions for hanging built in to the housing. Condensate pan shall be lined with closed cell, fire retardant foam insulation to prevent water from contacting the pan, thus minimizing the possibility of corrosion.

Horizontal units shall be fully enclosed type and shall include extended drip tray at the coil header to provide positive control of condensate at control valve assembly. Motor blower assembly shall be designed for easy removal from basic unit for servicing of motor and for access to coil face for cleaning.

b. Horizontal cabinet galvanized steel panels shall be double wall construction, acoustically and thermally insulated with 1 inch glass fiber installed between the double wall panels. Side panels shall be removable for access to motor blower assembly, valves and piping. Panels shall be secured with half turn latches (screws are not acceptable). Front and rear panels shall have one inch duct collars for return air and supply air duct connections.

c. Coils shall be fabricated of 1/2 inch copper tubes with aluminum fins mechanically bonded to the tubes. Coils shall be factory leak tested under water and suitable for design pressures of 350 psig.

d. Units specified to contain electric heaters shall be furnished with electric resistance heaters with capacity as scheduled and two-step control minimum. Heaters shall be open-wire type with nichrome wire mounted in ceramic insulators. The heater element shall be controlled by a 24 volt N.O. contactor. Units shall require single-point power connections.

e. Cabinet models shall be furnished with 2 inch disposable filters as standard. Furnish with one spare set of filters per unit.

f. "A" cabinet fans shall be centrifugal, forward-curved, double-width wheels. "B" cabinet fans shall be backward inclined airfoil blade type with adjusted v-belt drive. Blower housings shall be galvanized steel with rolled perimeter seams for added rigidity.

g. Motors shall be resilient mounted with Underwriters listed thermal overload protection. Motor bearings shall be sleeve or ball type with oversized oil reservoirs to assure positive lubrication with minimum service requirements. Standard motors shall be permanent split capacitor type. All factory wiring shall be in enclosed BX cable.

h. Unit capacities shall be certified in compliance with ARI Standard 440-89. Units shall be listed with Underwriters Laboratory (UL) Standard 883.

i. Fan coil unit options shall include:

1. Two-way electric motorized 350 psig wwp control valve (modulating type)
2. Shut-off valve
3. Two-speed fan switch mounted on the unit
4. Low-voltage control transformer-prewired on primary side.

j. Fan coil units shall be as manufactured by Aaon Coil Products, Inc., or reviewed equivalent.

HV-22 CEILING TRANSFER FANS

a. Install ceiling fans indicated on the plans and as listed in the schedule. Fans shall be centrifugal, direct drive. Fans shall bear the AMCA Certified Ratings Seal and the UL label.

b. Fans shall have acoustically insulated housings. Manufacturers shall submit vibration amplitudes and magnetic motor hum in decibels or sones. Integral backdraft damper shall be chatterproof. Entire fan motor and wheel assembly shall be removable without disturbing the housing.

c. Permanently lubricated squirrel cage induction motors shall be suitably grounded and mounted on rubber-in-shear vibration isolators. Terminals shall be provided with cord, plug and receptacle inside the housing.

d. Fan manufacturer shall furnish variable speed switch for each fan (mounted directly on fan housing). For fans EF-1, 2, 4, 6 and 7 furnish also with a pilot-type on-off switch.

HV-23 DUCTWORK

a. All ductwork, register boxes, dampers, and all auxiliary work and products of any kind necessary to make the various air conditioning and ventilating systems of the building complete and ready for satisfactory operation, shall be furnished and installed.

b. Construct ductwork and casings and supports of galvanized steel or aluminum in accordance with the appropriate standards of the Sheet Metal and Air Conditioning Contractors National Association.

c. All ductwork indicated on drawings is schematic. Therefore, submit changes in duct size and location if necessary to conform to field conditions.

d. Dimensions given on drawings of all acoustically lined ducts shall be clear inside dimension. For example: increase sheet metal duct size by 2" in each direction to accommodate 1" of acoustic lining.

e. Install volume damper at branches connected into the main without a neck.

f. Where hanger rods for ducts, piping, or equipment must pierce ducts, provide closure plates fitted around the rod and riveted or welded to the duct. Use duct compound to make an airtight seal.

g. Construct volume dampers of 16 gauge galvanized steel with hemmed edges. In ducts over 15" in depth use multiple opposed blade type, gang operated. Operating levers to be indicating type with locking quadrants, Ventfabric #555 or #560.

h. Access doors shall be provided in all ductwork for access to fire dampers, air valves, automatic dampers and coils, filters, fans, and other products which require access.

i. Access Doors: Double insulated reinforced panel type. In ductwork: Minimum 16" x 12" with two brass butt hinges and Ventlok No. 140 latches. In casings: 60" x 18" with three brass hinges and two Ventlok No. 310 latches and pulls.

j. Turning Vanes: Galvanized steel double vanes in a galvanized steel frame.

k. All galvanized ductwork shall be hung with galvanized hangers in accordance with SMACNA, ASHRAE, and BOCA Code requirements.

l. Provide supports and fastenings adequate to insure permanent stability and to effectively resist all applied loads. Fasten hangers and supports by clips fastened to structure by expansion anchors or through-bolted. Where required, provide supplementary steel angles or channels.

m. Do not hang or support one duct from another.

n. Extend strap hangers along bottom of the duct. Fasten to the duct bottom by bolts or rivets and to the side by bolts or rivets with one fastener per foot or less of duct height.

o. Use bolted or welded structural angle iron frames to support rectangular ductwork and associated equipment from floor or roofs.

p. A snap-lock seam shall not be permitted.

q. Use gasketed type joint when dissimilar metals are joined.

r. Sealant shall be applied to supply ducts and exhaust ducts. All longitudinal seams shall be sealed with 3M red duct sealant in the sheet metal shop during fabrication. All transverse joints shall be sealed with 3M red duct sealant. Connections from branch duct to diffuser collars shall be sealed.

s. Flexible connections of vinyl coated woven nylon/polyester blend fabric to prevent the transmission of vibration through the ducts shall be installed on both the supply and return sides of all fans, air conditioning, and ventilation units, approximately where shown on the drawings. Cloth used for flexible connections shall be "Ventglas" as manufactured by Ventfabrics, Inc., Duro Dyne Excelon Fabric or as approved. Flexible connection shall be a minimum of 10" long and fitted to provide an airtight connection. Provide gaskets on Class II and Class III fan collars.

t. Screens on open end duct: Provide #16 U.S.S. 3/4" wire mesh screen over each air opening in hung ceiling except where provided with grille or register back.

HV-24 LOW PRESSURE STEEL DUCTWORK

a. Ductwork in low pressure duct system with duct velocities less than 2000 FPM and static pressure in duct 2" WG or less. Return and exhaust ductwork.

b. Sheet metal gauges, transverse joint type and spacing, reinforcing type and spacing, in accordance with the latest ASHRAE and SMACNA Schedules for low pressure ductwork, except no ductwork less than 24 gauge. Longitudinal seams Pittsburgh Lock. Seal transverse joints with non-hardening sealant (3M "Red"). Longitudinal seams shall be sealed in the shop during fabrication.

c. Cross break or bead each duct section on four sides of ducts over 17" in largest dimension. Install 3/8" stay rods in ducts over 72" at each transverse joint. Spacing between rods or rods and side of duct shall not exceed 48".

d. Turning vanes as detailed on drawings and to conform to SMACNA Standards installed with first vane tight in outside corner and last vane no less than one vane space from throat or inside corner. Secure both sides of runners to top and bottom of duct at both ends, and 6" on center with sheet metal screws or rivets.

HV-25 MEDIUM PRESSURE STEEL DUCTWORK

a. Provide for all duct construction upstream of constant volume regulators (CV's) used at auxiliary (ventilation) air systems.

b. Sheetmetal gauges, transverse joint type and spacing reinforcing type and spacing, in accordance with latest ASHRAE and SMACNA Standards for 4" positive pressure.

c. Longitudinal and transverse seams and joints made up with a thick coat of non-hardening duct sealant such as 3M Brand EC-800, or approved equal, except spiral lock seams.

d. Companion angle joints with miter and welded angles. Grind mating side of weld smooth. Ducts 37" and over with companion angle joints shall have companion flanges bolted at 4" O.C.

e. Round ducts spiral lock. G.I. Company, Sheet Metal Products, United Sheet Metal, Pacific Air Products, or as approved. Round ducts over 60" with butt welded, longitudinal seams, and flange joints.

f. Fittings in round ducts shall be no lighter than 20 gauge, and welded. G.I. Company, Sheet Metal Products, Units Sheet Metal, Pacific Air Products, or as approved. Branch tee take-offs made with "Con-T" type conical tee fittings. Where main duct reduces in size after take-off, use "Con-T" or turns, and 3-piece for 45 degree turns.

g. Pressure Test: Medium pressure ductwork upstream of air terminal units shall be pressure tested and proven to leak less than 3% of the design flow rate at 4" W.G. Seal all ends of unfinished sections of ductwork. Pressure test with external fan and orifice plates so that leakage may be accurately measured. Testing procedure shall be performed as per SMACNA "HVAC AIR DUCT LEAKAGE TEST MANUAL".

HV-26 FLEXIBLE DUCTWORK

a. Insulated low pressure type: Genflex Type LPS-181, Wiremold, or approved equal, with positive interior air seal which shall prohibit insulation fiber erosion. Factory insulated with 1" thickness of 1 lb. density fiberglass insulation sheathed in Class 1 vapor barrier, UL labeled, and meet latest UL Class 1 Fire Hazard Classification of NFPA Bulletin 90-A. Use for connection between air supply duct to air outlets and other indicated locations. Install in accordance with manufacturer's instructions.

b. Flexible duct to be installed in a fully extended condition free of sags and kinks, using minimum length required to make connections. Lengths shall in no case exceed 3 feet. Joints and/or connections made by thoroughly coating interior of duct to a depth of 2" with high pressure duct sealer and securing in place over sheet metal collar with Genflex Model QC, or approved equal.

HV-27 DUCT LINING

a. General: Acoustical insulation adhesive, mastics and related material shall be of non-combustible materials to meet Code and with UL flame spread rating of 25 maximum and smoke developed rating of 50 maximum.

b. Provide internal duct insulation for a minimum of 10 feet downstream of fan-coil units, 15 feet downstream of base building air supply shafts, 10 feet upstream and downstream of all exhaust fans, on all transfer air ductwork and where indicated on the Drawings. Apply insulation on all interior surfaces.

c. Apply insulation with faced surface exposed to the air stream. Fasten insulation to interior of ducts and casings with welded pin or clip fasteners. Space fasteners a maximum of 18" on center in the longitudinal direction and 12" on center in the transverse direction, in accordance with SMACNA standards. Caulk butting edges to form a smooth surface with no raw edges exposed. Provide metal nosing on all leading edges.

d. Insulation Thickness: 1 inch unless otherwise noted.

e. Line ductwork with 1½ pound density flexible fibrous glass blanket with a non-eroding interior surface.

f. The duct lining coating shall not support the growth of fungus or bacteria in accordance with ASTM C1071 and ASTM G21 and G22.

g. Schuller Manville Permacote Linacoustic.

HV-28 MANUAL DAMPERS

a. Provide adjustable dampers necessary for proper control and balancing of air distribution. Furnish dampers in all branches, with operating levers readily accessible. No damper greater than 48" long. For greater lengths, provide dampers in equal sections as required.

b. Damper shall be constructed as same material as ductwork, except as otherwise specified. Rigid construction, free of all rattling and vibration, with edges crimped or creased for stiffness.

c. All dampers shall have through rods, not less than 3/8" diameter fastened to blade with 2 or more yokes with set screws, with steel washer at each end of damper rod.

d. Damper blades are to be two gauge numbers heavier than ductwork in which they are to be installed; 18 gauge and lighter shall have both edges double hemmed. Blades longer than 35" shall have "V" crease in middle to receive damper rod.

e. Dampers shall have through rod axles with 14 gauge bearing plate at one end, and quadrant and lever with lock screw at the other end.

f. On insulated ductwork, mount quadrant metal saddles finishing flush with insulating surface.

g. Dampers less than 16" high can be single blade; 16" and deeper shall be multi-blade. Splitter dampers are not acceptable for air balance, volume dampers shall be used.

h. Provide teleflex cables for remote damper operation as required.

i. Dampers utilized for tight shutoff shall not permit leakage in excess of 1% volume with a pressure differential of 6" w. g.

j. Multi-Blade Dampers: Opposed blade type, and shall comply with requirements for single blade dampers. All damper rods, linked together to operate as a unit.

HV-29 CABLE OPERATED DAMPERS

a. Provide cable operated remote controlled volume dampers in inaccessible branch ducts feeding linear diffuser plenums and rectangular air outlets located in gypsum board and spline ceilings. Dampers shall be adjustable through the diffuser face with standard tools, providing positive balancing of multiple airflows to maintain design air throw and noise criteria.

b. Extruded aluminum damper shall be gear actuated by a brass plated rotary cable meeting Mil-spec 1-45208 and supported at each end by self-lubricating bearings in extruded aluminum support brackets.

c. Rotary cable shall have a minimum torque service factor of 200% when installed in accordance with manufacturer furnished instructions. Cable assembly shall snap-fit into damper for ONE PIECE installation with no linkage adjustment requirement or small parts to get lost on site.

d. Adjustment end mounting bracket shall screw to plenum wall or install with factory furnished double face tape and push-in fastener, facilitating one hand installation in plenums as narrow as 2". Positive, direct, two-way damper control shall be provided with no sleeves, springs, or screw adjustments to come loose after ceiling closure.

e. Acceptable manufacturers: Metropolitan Air Technology Inc. Model #RT-100 or reviewed equivalent.

HV-30 FIRE DAMPERS

a. Provide fire dampers with access doors installed where shown, and as required by all local codes. In general, fire dampers are required where ducts pierce fire rated floors, walls and shafts, or where unducted transfer openings are located in fire rated barriers.

b. Fire dampers shall be similar to Air Balance, Inc. Model No. 119, Type B or Type C, or as approved for rectangular and round ducts. Dampers shall meet the requirements of NFPA Bulletin No. 90A, and shall be tested in accordance with UL 555 Test Criteria for Fire, Corrosion and Dust Loading, labeled and listed by Underwriters Laboratories.

c. Fire dampers shall be installed as detailed on the Drawings with retaining angle iron frames, sleeves and breakaway connections.

d. Dampers must be able to fully close with the operating maximum airflow and pressure present.

e. Dampers installed horizontally in vertical ductwork shall be spring loaded to close without the aid of gravity.

HV-31 ACCESS DOORS IN SHEET METAL WORK

a. Wherever necessary in ductwork, casings or sheetmetal partitions, provide suitable access doors and frames to permit inspections, operation and maintenance of controls, fire dampers, filters, bearings, traps, or other apparatus concealed behind the sheet metal work. All such doors shall be of double construction of not less than No. 20 gauge sheet metal, and shall have sponge rubber gaskets around the entire perimeter. Doors in insulated ducts or insulated casings shall have rigid fiberglass insulation between the metal panels.

b. Access doors in sheet metal ducts shall be hung on heavy flat hinges and shall be secured in the closed position by means of cast zinc clinching type latches. Where space conditions preclude hinges, use four (4) heavy duty window type latches. Doors in ductwork shall, in general, be no smaller than 18" by 18", except for access doors to fire dampers which may be larger depending on size of fire damper and need to service the fusible links.

c. In no case shall access to any items or equipment requiring inspections, adjustments, or servicing require the removal of nuts, bolts, screws, wing nuts, wedges, or any other screwed or loosed device.

d. Access doors shall be provided where needed for existing components of systems as well as all new components added under this contract whether or not shown on the plans.

HV-32 CEILING DIFFUSERS, REGISTERS AND GRILLES

a. For model numbers refer to the drawings.

b. Factory finish new air outlets with semi-gloss baked enamel in a color approved by the Architect. Paint visible dampers and accessories flat black.

HV-33 AIR BALANCING

a. Air balancing firm or representative must be qualified and submit evidence before engagement.

b. Take air readings prior to construction to determine existing conditions serving the demised space and effecting adjacent spaces. Traverse main ducts supply air and/or take air outlet readings to determine boundary conditions. Refer to building rules for additional requirements.

c. Upon completion of the air system installation, air balancer shall examine air movers, return system and supply system for open air ways and normal operating conditions. Perform air system balance in accordance with the Standards of American Air Balance Council under the witness of Owner's representative.

d. Provide new fixed sheave and/or belts, as required, to achieve design balance points for each unit.

e. Submit Air Balance Reports, including design and actual quantities for each product, including fans, air outlets, etc. Static pressure readings at various points in and around AC equipment shall be shown on schematic diagram of system.

f. Air balance and adjustments shall be provided until acceptable to the Owner's representative.

g. Contact building management to schedule balancing procedures.

h. Balance all supply, return and exhaust systems to the quantities indicated on the Drawings with the following tolerances:

1.	Fans	-	Design volume plus 5%
2.	Leakage	-	5% maximum
3.	Outlets	-	Design volume plus or minus 5%

i. Take pitot traverse readings of main ducts at shaft connections and air handler or AC unit discharge. Record static pressure at time of reading. Readings shall be taken after final balancing and shall include sketch indicating reading locations.

j. Add volume dampers as required for final balancing.

k. Record exhaust fan cfm, inlet static pressure, discharge static, volts and amps.

l. Record AC unit cfm, static pressures, volts, amps on evaporator section and condenser section as applicable.

m. Contractor to perform necessary comfort balancing after move-in.

HV-34 WATER DETECTION AND ALARM SYSTEM

a. General: Furnish and install, as shown on the drawings, and as specified herein, a complete water detection and alarm system. The system shall consist of a point detection system capable of quickly detecting the presence of water in any of the supplemental AC unit auxiliary drain pans, and miscellaneous under floor piping.

b. Point Detection System: Each of the fan-coil units above the ceiling, each floor-mounted CAC unit in the Computer Room, and the Telephone Room CAC unit will be installed with auxiliary drain pans beneath them. Each of the drain pans will be continuously monitored for the presence of water by a liquid detection device. Each AC unit pan shall be monitored by one (1) length of sensing cable, each Computer Room CAC unit pan by one (1) length of sensing cable, and the underfloor piping group by one (1) length of sensing cable. Each cable will be complete with proper termination device and wiring tails or terminals for connection to the alarm panel. Refer to the respective piping details for more information.

c. It is **not** the intent to be able to locate the exact point of a leak in terms of distance, rather, each cable shall be utilized as a point detector. Refer to the piping plan for approximate lengths of cables required. Exact lengths of cables shall be determined in the field for actual conditions after piping has been installed. The length of cables for the auxiliary drain pans shall be a minimum of four (4) feet each.

d. Each of the leak detection points shall report back to a central display/alarm panel located in the Computer Room, each constituting a "zone". The panel shall have the following features;

1. Remote, wall mounted multi-point panel capable of displaying the status of up to 20 zones, powered by 120VAC with zone relay outputs activated by the detection of water, or detector fault.

2. Removable screw terminal connections.

3. One (1) red "alarm" LED to indicate a leak has been detected.

4. One (1) green "system normal" LED to indicate power is on and no faults exist.

5. Field customized alarm message window for leak identification ("FCU-1" through "FCU-13", "CAC-1" through "CAC-3", and "Underfloor Piping").

6. An audible alarm with a silence/update pushbutton.

7. Low voltage power supply transformers as required, mounted within the panel.

8. Two (2) common alarm dry contacts (1 N.O., 1 N.C.) for connection to the remote security alarm panel. Contacts rated for 3.0Amps at 120Volts.

9. Retriggering/remapping for each new alarm occurrence.

10. Manual alarm reset.

11. Battery backed operation, 2 hours minimum.

e. Manufacturer: The following model numbers are furnished for standards of quality, and are based on PermAlert products. Other manufacturers include Darwell, Raychem, or approved equal.

1. Point Detection Panel for FCU's and Underfloor Cables, Etc.: Model AT20C.

2. Cable Type Point Detectors: Model AGW-Gold.

3. Jumper Cables: Model JMP.

4. The leak detection equipment manufacturer shall furnish all required connectors, splice kits, end kits, etc. for a complete and operative system.

f. The Mechanical Contractor shall include all necessary low-voltage wiring associated with this system in his scope of work including connecting the leak detection panel common alarm to the security system panels in the Telephone Room.

HV-35 AUTOMATIC CONTROLS

a. General:

1. Standards: Except as modified by local governing codes and the Contract Documents, comply with the provisions and recommendations of UL, ASME, ASTM, ASHRAE, NBFU, NEC and NFPA.

2. Controls Contractor: Work included under this section shall be provided by a qualified temperature controls installer with a minimum of five years experience.

3. Acceptable Control Contractors: Landis & Staefa, T.S. Brown Associates, T.M. Bier & Associates, Energy Management Systems, or as approved.

b. Components:

1. The automatic control system shall be complete with all necessary sources of electricity, sensors, controllers, relays, switches, transformers, gauges and interconnecting wiring and tubing to control the system in accordance with the sequences specified.

2. Pneumatic control air shall be taken from the building system as directed by the Building Engineer.

3. Include the design of all necessary motor control and interlock wiring to achieve the required sequence of operation. The controls contractor shall furnish and install all required control wiring.

4. All thermostats for fan-coil AC units shall be digital, 7-day programmable type with built-in clock, occupancy override button, battery backup, and LED display. Thermostats shall be Honeywell Chronotherm III, or reviewed equivalent. Unless otherwise noted, install wall mounted thermostats 5'-0" above the floor measured to the centerline of the instrument. Obtain Architects approval of exact mounting location prior to installation.

c. Provide to Owner a copy of the as-installed control system for each mechanical system. Instruct Owner on how to operate systems.

d. Mount surface mounted control devices on brackets to clear the final finished surface of insulation as needed. Install control valves horizontally with the power unit up. Install controls so that adjustments and calibrations can be readily made. Calibrate controls as required after installation.

e. Conceal control conduit in all spaces except in the Mechanical Equipment Rooms and in unfinished spaces. Install in parallel banks with all changes in directions made at 90 degree angles.

f. Submit shop drawings as prepared by automatic temperature control manufacturer. Wiring diagrams shall be submitted expeditiously to allow reasonable installation time. Submittals shall include:

1. Sequence of operation and flow diagrams for all control systems
2. Equipment catalog and performance data for components
3. Wiring diagrams

HV-36 CONTROL VALVES

a. Automatic control valves shall be fully proportioning with modulating plug or V-port inner valves unless specified otherwise. The valves shall be quiet in operation.

b. Control valves shall be sized by the control manufacturer and shall be guaranteed to meet the cooling loads as scheduled.

c. Control valves shall be suitable for the pressure conditions and shall close against the differential pressures involved. Valve operators shall be of the molded synthetic rubber diaphragm type. Body pressure rating and connection construction shall conform to fitting and valve schedules. Control valve operators shall be sized to close against a differential pressure equal to the maximum system pressure plus 10 psi for valves and operators.

HV-37 CONTROL MOTORS

a. Actuators shall be provided with suitable corrosion resistant linkages for valves or dampers. Except as specified herein, all actuators shall be sized for the load/close off encountered in strict accordance with manufacturer's recommendations. All actuators shall drive to their "normal" position anytime their associated equipment is shut down. Actuators for valves above 2" shall be spring return heavy duty type with oil immersed gear train. Actuators shall be low-voltage type.

HV-38 SEQUENCE OF OPERATION

a. Ceiling-mounted CAC Units (CAC-3)

1. CAC unit shall be started and stopped from wall mounted microprocessor control panel.

2. Unit two-way chilled water valve shall modulate in response to room temperature as sensed from wall mounted space sensor.

3. Condensate pump with high level float switch shall alarm at the AC-unit control panel. The unit shall continue to operate normally during alarm condition.

4. Leak detector located in AC unit external drain pan shall alarm at the leak detection alarm panel. The unit shall continue to operate during alarm condition.

5. Smoke detector shall alarm at the unit control panel. Unit shall shut-down until alarm condition is cleared.

6. The unit's common alarm contact shall be tied into the security system panel in the telephone room. The alarm condition shall be monitored by the security system.

b. Ceiling Transfer Fans:

1. Fans EF-1, EF-4, EF-6 and EF-7 shall be started and stopped from pilot-type wall switch located in the room.

2. Fan EF-2 shall be controlled by light switch.

3. Fan EF-3 shall run 24-hours/day (continuously).

4. EF-5 shall be controlled by space-mounted thermostat.

c. Floor Standing CAC Units (CAC-1 and CAC-2)

1. CAC units shall be started and stopped from unit mounted microprocessor control panel.

2. Wall mounted thermostat and humidistat shall sequence chilled water flow electric reheat coil and electric humidifier to provide cooling, heating and humidification as required to maintain set points.

3. Smoke Detector: Unit-mounted smoke detector shall alarm at the unit control panel. Unit shall shut-down until alarm condition is cleared.

4. Condensate Pump: High level float switch shall alarm at the CAC unit control panel. AC unit shall continue to operate normally.

5. Water Leak Detection: Water leak sensor cable in the CAC unit drain pan shall alarm at the leak detection panel. CAC unit shall continue to operate normally.

6. The unit's common alarm contact shall be tied into the security system panel in the telephone room. The alarm condition shall be monitored by the security system.

d. Fan-Coil Units

1. FCU's shall be started and stopped from its respective wall-mounted thermostat. Thermostats to be digital, 7-day/24-hour programmable type with battery backup (Honeywell Chronotherm III, or approved equal).

2. Fan-coil units' fans shall operate continuously when in the "ON" mode.

3. Each FCU's capacity shall be regulated by modulation of a two-way chilled water flow control valve. The valve shall be normally open. The electric heater shall be sequenced to operate to maintain room temperature set point.

4. Each FCU's condensate pump shall operate via an integral float switch. A high level switch shall alarm at the leak detection alarm panel. Unit shall continue to operate.

5. Leak detection located in the auxiliary drip pan shall alarm at the leak detection panel. Unit shall continue to operate.

HV-39 BID UNIT PRICES

a. Unit prices to be applied for work additions to and deletions from bid prices quoted to systems herein. Prices shall be inclusive of overhead, profit, sales tax, excise tax, all at no additional cost to the Owner.

b. Sheet metal price shall include necessary appurtenances such as turning vanes, single blade volume dampers, hangers, slips, for an operable installation.

c. Balancing shall be part of the diffuser or register charge.

d. Installed Costs

1.	Sheetmetal, low pressure	_____/lb.
2.	Sheetmetal, medium pressure	_____/lb.
3.	Acoustic lining, 1" thick	_____/sf.
4.	Fire Dampers	_____/sf.
5.	Ceiling Diffuser	_____/ea.
6.	Ceiling Grilles (No ductwork)	_____/ea.

7. Piping	Copper	Steel
1"	_____/ft.	_____/ft.
1½"	_____/ft.	_____/ft.
2"	_____/ft.	_____/ft.
3"	_____/ft.	_____/ft.
4"	_____/ft.	_____/ft.

8. Valves	Ball Valves	Butterfly Valves
1"	_____/ea.	
2"	_____/ea.	
3"	_____/ea.	_____/ea.
4"	_____/ea.	_____/ea.

9. Pipe Insulation	1" Thick	2" Thick
1"	_____/ft.	_____/ft.
1½"	_____/ft.	_____/ft.
2"	_____/ft.	_____/ft.

	3"	_____/ft.	_____/ft.
	4"	_____/ft.	_____/ft.
10.	Duct insulation 1½" foil wrap		_____/sf.
11.	Thermostat (temperature sensor)		_____/ea.

SECTION 15400
PLUMBING

P-1 GENERAL

a. All work in this section is subject to the Port Authority Standards and the General and Specific Conditions of these Specifications.

b. All work and materials shall comply with applicable provisions of the New York City Building Code and the Port Authority of New York and New Jersey..

P-2 WORK INCLUDED

a. It is the intent of these specifications to have this Contractor provide for the furnishing of all labor, materials, protection and supervision necessary and required to complete the Plumbing Work as indicated on the Drawings and described or referred to in these specifications.

b. All plumbing and drainage systems shall be installed in accordance with the pertinent requirements of the New York City Building Code, the Port Authority, National Sanitation Foundation, Health Department and other agencies or department having jurisdiction.

c. All work shown on the drawings is diagrammatic and shall be installed to fit actual building conditions, all subject to approval. This Contractor shall, as part of this Contract, furnish all incidentals such as pipes, fittings, valves, pipe hangers and supports, etc., and all removals, testing, cleaning and miscellaneous items necessary to leave each system complete in every detail and ready for operation.

d. If mention has been omitted in the specifications of any work shown on the drawings or if work not shown on the drawings is called for in the specifications, same shall be included as part of the work of this Contractor.

e. Special care shall be taken during construction to prevent unnecessary damage to existing structure. All removal and cutting to permit installation of new equipment or piping shall be done only after receiving approval of Owner's representative. Equipment to be removed is the property of the owner and shall be disposed of as directed.

f. Provide all labor and new materials required for the removal of inactive piping and the installation of new sink, ice maker, coffee machine, dishwashers, floor drains, filter, lavatories, water closets urinals, waste, vent, hot and cold water piping, for a complete system ready for Owner's use.

g. Care shall be taken when cutting into existing water and drainage line to prevent accidental flooding of premises.

h. Perform all necessary removals of existing plumbing piping and materials. All existing plumbing materials must be removed before new work is commenced. All new connections to stacks shall be on overtime and coordinated with Building Management and Tenant.

i. Filing and paying all fees and obtaining all approvals from the Local Building Department and authorities having jurisdiction.

P-3 RELATED WORK IN OTHER SECTIONS

a. Patching and framing.

b. All electrical conduits, power wiring, etc. for equipment.

P-4 OPENINGS AND CHASES

a. Provide all openings, chases, recesses and bucks that are required for the admission of the work.

b. Inspect the general plans for pipe spaces. Do all necessary cutting, if such is required, to allow for the admission of the work. Remove all surplus materials and dispose of same, as and where directed.

c. Cutting shall be done with hand tools. No cutting by jackhammer will be permitted.

P-5 CONSTRUCTION NOTES

a. It is the intent that each part of the system shall be complete in all details and water lines provided with all control valves necessary for satisfactory operations and maintenance.

b. Examine carefully the plans of other trades in detail and all conditions relative to the installation of piping.

c. In no case shall piping be exposed beyond finished plaster lines unless specifically shown otherwise on drawings. Consult with the other trades in the building and install piping in such a way as to least interfere with the installation of other trades.

d. The water piping shall be installed so as to drain and branches shall not be trapped but shall have continuous pitch.

e. Piping shall be installed so as to avoid ducts and electric light outlets and before the installation of same consult with the other trades and facilitate the erection of the equipment.

f. After cutting, all pipes shall be reamed out to full bore and before erection the inside of all pipes shall be thoroughly cleaned.

P-6 MATERIALS - GENERAL REQUIREMENTS

a. All materials shall be new and the best of their respective kinds, suitable for the conditions and duties imposed upon same at the building. Materials shall match existing for similar service except as otherwise noted herein. They shall generally be of representative manufacture. Brand names are specified to indicated a standard of quality only.

P-7 DRAINAGE SYSTEM

a. Waste including indirect waste, soil and vent piping 4 inches and under shall be ASTM A53 galvanized steel, Schedule 40, with galvanized cast iron ANSI B16.12, Class 125, screwed fittings. No-hub piping is not permitted.

b. Waste, soil and vent piping over 4 inches shall be ASTM A74 cast iron, service weight hub and spigot type with caulked joints. The pipe shall pack firmly with hemp or picked oakum and fill with molten lead. After the lead has cooled, the joints shall be throughly caulked, using approved caulking irons.

P-8 WATER PIPING

a. Install new domestic water piping as indicated with hot and cold water connecting to fixtures requiring same as indicated on the drawings.

b. Domestic water piping shall be Type "TP" threadless copper pipe, conforming to ASTM B302. The fitting shall be cast bronze for brazing, conforming to ANSI B16.18. No other type materials and fittings are allowed.

P-9 HANGERS AND SUPPORTS

a. All piping shall be substantially supported from the building structure. All hangers, rods and supports shall be specifically approved for use intended. Hangers and supports shall be installed in strict conformity with Local Building Code and Port Authority of New York and New Jersey requirements.

b. Where overhead construction does not permit fastening of hanger rods, inserts, etc., in required locations, provide additional steel framing as required and approved.

c. Expansion shields shall be provided to support hanger rods at required intervals. Expansion shields shall be Star Expansion Manufacturing, "Phillips" Anchors, Diamond "Redhead", or Hilti Co.

d. Chains, straps, perforated bars or wire hangers are not permitted.

e. Unless otherwise specifically approved, hanger and rod size and spacing shall be within the following limits:

1. Steel Pipe

	Pipe Size	Max. Hanger Spacing	Min. Rod Size
a)	1/2" to 1"	8 ft. o.c.	3/8"
b)	1¼" to 2"	10 ft. o.c.	3/8"
c)	2½" to 3½"	12 ft. o.c.	1/2"
d)	4" and 5"	12 ft. o.c.	5/8"
e)	6"	12 ft. o.c.	3/4"
f)	8", 10" and 12"	12 ft. o.c.	7/8"

2. Copper Tube

	Pipe Size	Max. Hanger Spacing	Min. Rod Size
a)	1/2" to 1¼"	6 ft. o.c.	3/8"
b)	1½" to 2"	8 ft. o.c.	3/8"
c)	2½" to 3½"	10 ft. o.c.	5/8"
d)	4" and 5"	12 ft. o.c.	5/8"
e)	6"	12 ft. o.c.	3/4"
f)	8" and 10"	12 ft. o.c.	7/8"

3. The above hanger spacings apply to straight runs of pipe only. At points where valves, specialties, or branch connections are located, additional hangers, or supports shall be used to properly support the load.

P-10 VALVES

a. Furnish all shut off valves, of Jenkins Bros, NIBCO Inc., Stockam Valves and Fittings or Walworth as indicated on the plans, or as may be required for the proper control of the pipe lines installed under these specifications, so that any fixture, line or piece of apparatus may be cut out for repair without interference or interruption of the service to the rest of the building. All shutoff valves shall be ball type: Class 150, bronze body, full port, bronze trim threaded or soldered trim. All valves shall be of one manufacture. Pressure reducing valves shall be base building standard, all bronze, set at 50 psi and to maintain constant discharge pressure regardless of changing flowrate and/or varying inlet pressure. Similar to J. R. Gunzen Hauser Model 1130H, or approved equal.

P-11 AIR CHAMBERS AND VACUUM BREAKERS

a. Provide air chambers for all isolated fixture at least 12" high and same size for piping but not less that 1/2".

b. Pressure vacuum breakers as required shall be installed 12 inches above the highest outlet they are protecting.

P-12 INSULATION

a. All new cold and hot water piping, including mains, and branches shall be insulated with 1/2" glass fiber covering with factory-applied all-service jacket "ASJ", with self-sealing laps, molded fittings, securely wired on with copper wire.

b. Fittings, valves shall be insulated with 18 gauge galvanized steel wire. Pre-molded PVC insulation covers for fittings are not allowed.

c. Water piping insulation material shall have a maximum flame spread rating of 25 without evidence of continued progressive combustion, and shall have a maximum smoke developed rating of 50, as per paragraphs (13), (3), Section P-102.4, RS 16-3 of New York City Building Code.

d. Insulation shall be as manufactured by Certainteed, Manville Corp, Owens - Corning Fiberglass or Knauf Fiberglass.

e. All valves, flanges, etc., in insulated piping shall be covered similar to the fittings. Valve handles shall not be covered.

f. Covering shall be continuous through walls and floors.

g. This Contractor shall furnish and install "Insul-Shield MultiPurpose Pipe Saddle" as manufactured by Insul-Cousitc Corp. Insul-Shield shall be installed at each support point when the pipe is erected. The thickness of press-glass support segment shall be equal to the thickness of the adjoining insulation when load is applied.

P-13 PLUMBING FIXTURES AND EQUIPMENT

a. Plumbing fixtures shall be as specified by Architect and installed under this contract. Provide all necessary P-traps, flush valve, water supplies, angle stops, escutcheons, etc., and make all final connections to equipment. All exposed trim shall be cast brass chrome plated.

b. Water filters shall be Aqua-Pure Model AP 200 to filter impurities as small as 5 microns with AP 217 cartridge. Provide extra cartridge to Owner for each filter.

c. Backflow Preventers - Watts Series 909QT.

P-14 ESCUTCHEONS AND SLEEVES

a. Where pipes pass through wall, floors or partitions, suitable 16-gauge galvanized pipe sleeves shall be provided and the spaces between sleeves and pipes shall be tightly caulked.

P-15 FLOOR DRAINS

a. Type "A" floor drain (pantries): Zurn Model ZN-415 with "B" strainer.

b. Type "B" floor drain (pre-action closet): Zurn Model Z-526 with "B" strainer and sediment bucket.

P-16 HYDROSTATIC TESTS

a. Domestic Water

1. Cap or plug all outlets. Apply hydrostatic pressure of 125 psi. The pressure should not drop during a one hour test period.

2. For piping added, relocated or replaced on existing systems, apply a hydrostatic pressure of 50 psi above the existing system pressure. The pressure should not drop during a one hour test period.

b. Sanitary Drainage and Vent

1. When piping is tested in sections, test piping with a pressure equivalent to a 10-foot water head. The water level shall be maintained for one hour.

2. For piping added, relocated or replaced on existing systems, install a test tee at the lowest elevation of each added, relocated or replaced piece of pipe and fill it with water to overflow level or next highest fixture outlet or drain. The water level shall be maintained for one hour.

P-17 DISINFECTION OF POTABLE WATER SYSTEMS

a. The pipe system shall be flushed with clean, potable water until no dirty water appears at the outlets.

b. The system or part thereof shall be filled with a water-chlorine solution containing at least 50 parts per million of chlorine and the system or part thereof shall be valved off and allowed to stand for 24 hours or, the system or part thereof shall be filled with a water-chlorine solution containing at least 200 parts per million of chlorine and allow to stand for 3 hours.

c. Following the prescribed standing time, the systems hall be flushed with clean potable water until no excess chlorine remains in the water coming from the system.

d. The procedure shall be repeated if it is shown that contamination still persists in the system.

P-18 DISSIMILAR METALS

a. Connection between dissimilar metals, such as ferrous and nonferrous, shall be isolated by means of a dielectric material such as teflon, micarta or screwed insulating unions or flange unions as manufactured by Epco Sales, Inc., to provide cathodic protection currents and to stop galvanic corrosion.

P-19 SHOP DRAWINGS

a. Submit to the Architect for approval six (6) copies of shop drawings for the following equipment: Piping, insulation, valves.

b. Shop drawings shall include all dimensions, materials and auxiliary equipment.

P-20 VERIFYING CONDITIONS

a. It shall be absolutely mandatory for all bidders to visit the site and inspect all existing conditions firsthand. Arrangements for inspection shall be further confirmed and verified with the Owner.

b. Before starting any work examine existing conditions, and thoroughly check drawings, specifications, adjoining or underlying conditions in which the work of this Section is to be performed, and all dimensions.

c. Report in writing, to the Owner with a copy to the Engineer, any and all conditions which may interfere with or otherwise affect or prevent the proper execution and completion of the work of this Section.

d. Do not commence any work until any and all such conditions have been corrected.

e. Failure to notify the Owner and/or the Engineer of unsatisfactory conditions will be construed as an acceptance of all conditions.

f. Execution of work of this Section Constitutes acceptance of the base or adjoining work and other conditions as satisfactory in every respect and later claims of defects in such cases will not be allowed.

P-21 CONDUCT OF OPERATIONS

a. The building in which work of this contract will be performed in an existing structure and will be occupied during the term of this contract.

b. Services to and throughout the building shall be maintained. Services may be interrupted only by obtaining permission to do so from the Owner in writing.

c. All materials and debris removed from construction shall become the property of the Contractor and he shall remove same from the premises as directed.

d. The work of the Contract shall be progressed in such a manner as to interfere as little as possible with the functioning of the Premises and with the safety and convenience of the occupants, staff, and others employed in and about the premises.

e. Contractor's attention is directed to the phasing of the work as determined by the Owner and shall schedule all delivery of materials and manpower requirements to expedite the work accordingly.

f. Routes of ingress and egress to the building and within the building to the site of the work shall be over routes as directed by the Owner's representative.

g. Delivery of materials and removals of debris shall be arranged for within time limits established by the Owner. The Contractor shall not, except as otherwise agreed to , deliver any materials to the site unless his forces are present and available to receive and unload it.

P-22 REGULATIONS

a. The Contractor shall familiarize himself with and comply with building regulations and rules to maintain the safety of the premises and its occupants at all times.

P-23 CLEANING

a. The Contractor shall neatly pile, store and protect all materials in locations on the premises where approved and directed. During work operations on the interior of the buildings, all refuse and debris shall be removed and the areas left broom clean.

P-24 INSTALLED COSTS

a. Piping

	Copper	Cast Iron (No-Hub)
1/2"	_____/ft.	---
3/4"	_____/ft.	---
1"	_____/ft.	---
1 1 4"	---	_____/ft.
1 1 2"	---	_____/ft.
2"	---	_____/ft.
3"	---	_____/ft.
4"	---	_____/ft.

b. Valves

	Gate	Check
3/4"	_____/ea.	_____/ea.
2"	_____/ea.	_____/ea.

c. Pipe Insulation - 1" Thick

3/4"	_____/ft.
2"	_____/ft.

d. Trap Primers _____/ea.

e. Water Filters _____/ea.

f. Floor Drains _____/ea.

g. Backflow Prevent Assemblies _____/ea.

h. Hose Bibbs _____/ea.

i. Pipe Heaters (HWAT) _____/ft.

SECTION 15500
SPRINKLER

SP-1 GENERAL

a. The Contractor shall perform work of this Section in accordance with the Port Authority Standards, General and Specific Conditions of these Specifications.

b. All work and materials shall comply with applicable provisions of the New York City Building Code RS-17-2, NFPA 13-1989 and B.S. of A 310-90 BCR and the "PANYNJ" World Trade Department regulations.

SP-2 WORK INCLUDED

a. Work shall include the providing of all labor, materials, equipment, accessories, and tests necessary to complete and make ready for operation the alteration of the hydraulic sized type automatic wet pipe sprinkler system with light hazard occupancy as indicated on the Drawing.

b. The installation shall be accomplished by an authorized sprinkler contractor recognized as a fully experienced specialist in the automatic sprinkler systems by the Building Department of the City of New York.

c. The installation shall be made on the and the Port Authority of New York and New Jersey basis of items, methods, and requirements of Department of Buildings of the City of New York. The provisions shall be followed in total, whether the stipulations listed therein are directed or recommended.

d. See Architectural, Structural, Mechanical and Electrical Drawings for construction and interference details. Any changes that may be necessary because of the physical conditions or compliance with the standards shall be made under this Section without additional cost.

e. System shall include, but not necessarily be limited to the following:

1. Removal of existing sprinkler heads, branch piping and loop piping except existing piping serving heads within core areas.
2. Connection of new sprinkler heads, branches and loop piping to existing sprinkler outlets.
3. New sprinkler heads of the flush type.
4. All piping hangers, supports.
5. Preparation of complete and detailed working drawings.
6. Obtaining all necessary approvals, permits and certificates including filing drawings with hydraulic calculations signed and sealed with the New York City Building Department.
7. Shutdown, drainage and testing shall be on overtime in coordination with Fire Department and Building Management.
8. Cutting and patching.
9. Maintaining a fire watch guard during shut-down of system.
10. New double interlock pre-action system for computer room.
11. Installation of new fire hose cabinets, angle valves and fire standpipe thereto.
12. Removal of existing fire hose cabinet and associated piping within Tanent Space and capping at source of water supply.

f. Working Plans

1. Before commencement of any work, complete and detailed working plans shall have been submitted and approved by the City of New York and other agencies having jurisdiction thereof. Two certified copies of such approved working plans shall be furnished to the Owner promptly after such approval.

2. Working plans shall be drawn to an appropriate scale on tracing cloth or film.

g. Design criteria for the hydraulic calculations for each floor shall include:

1. Available static pressure.
2. The minimum water supply requirement density and GPM per square foot.
3. Area of hydraulic demand.
4. Occupancy hazard classification.
5. Sprinkler piping and fitting material.
6. All existing piping sizes and available pressure.

h. Insurance: This section shall carry Liability and Workmen's Compensation Insurance for the duration of the Contract and protect the Architect against all lawsuits from accidents to the public and workmen. All premiums are to be paid by this Section and the policies are to cover any and all persons and contingencies in connection with the installation of the work included in this section.

SP-3 INSTALLATION

a. Specific reference in this section or on the drawings to any article, device, project, material or equipment by name, make, or catalog number shall be interpreted as establishing a basis and standard quality. All the devices shall be of the made and type listed by the Underwriters' Laboratories, Inc., approved by the local building code, and NFPA. No consideration will be granted for any alleged misunderstanding of the materials to be furnished or work to be done due to lack of information on the drawings or in the specifications.

b. This Contractor shall make modifications in respect to location of sprinkler heads, as may be required by field conditions or as may be found necessary by the Architect at the time of installation. Fittings, hangers, means of draining system and all necessary appurtenances shall be installed as required.

c. Any changes that may be necessary because of physical conditions or compliance with the standards and requirements of any agency having jurisdiction shall be made by this Contractor without additional cost to the Owner.

d. The system shall be so installed that no part thereof will interfere with doors, windows, heating, plumbing or electrical equipment, and sprinkler heads shall not be located closer than one foot from lighting fixtures or other obstructions. In connection therewith, the Contractor shall coordinate his work with the other trades so as to avoid any interference with the automatic sprinkler system.

e. This Contractor shall furnish and set sleeves in walls as required.

f. After the piping installation has passed the hydrostatic test, all iron and steel parts shall be thoroughly cleaned and ready for painting.

g. All piping shall be accurately cut to measurements established by this Contractor and shall be worked into place without springing or forcing.

h. Drips and drains shall be installed at low points and where required and shall discharge to open slight drains or to interior floor drains.

i. All pipe openings shall be capped or plugged during construction and all piping shall be flushed out before closing system.

j. The use of bushings to reduce the size openings of fittings is prohibited.

k. Before ordering any material or doing any work, the Contractor shall verify all measurements, ceiling heights and conditions at the size and will be held responsible for the correctness of the same.

l. Extra charges or compensation will not be allowed on account of the differences between actual measurements and the dimensions shown on the drawings, but any such differences which may be found shall be submitted to the Architect for adjustment, before proceeding with work.

m. The Contractor shall request fire standpipe riser and sprinkler shutdowns 48 hours in advance by notifying the PA/WTC Construction Inspector who will coordinate the shutdown. The Contractor shall insure that drainage will be discharged to an approved location or receptacle without causing damage to other work and property.

n. All unused piping, fire hose cabinets, hangers, and supports shall be completely removed back to the nearest active cross main, and be capped and sealed watertight. Any resulting openings through existing partitions shall be promptly patched, sealed and firestopped to maintain the partition's fire rating.

o. In the tower buildings all sprinkler piping shall be installed above the bottom cord of truss. Branch lines shall run through bridging trusses.

p. The Contractor shall furnish and install mounted shop drawing for each full floor sprinkler installation. The final as-built shop drawing shall be reduced to a width of two feet and mounted on the inside of the door of the existing closet on each floor which contains the control valve. The drawing shall be covered with a sheet of 1/8 in. lexan and screwed to the door. The drawing must show the entire floor sprinkler installations.

SP-4 MATERIALS

a. All wet system sprinkler piping shall be standard weight schedule 40 black steel pipe, conforming to ASTM A795/A53 with threaded cast iron fittings, Class 125, or malleable iron fittings Class 150. (Schedule 10 pipe, grooved piping and mechanical grooved fittings are not allowed at the World Trade Center.) Victaulic fittings are not permitted for size 3 inches and under unless otherwise approved.

b. For pre-action system galvanized steel pipe, Schedule 40, conforming to ASTM A795/A53 with galvanized threaded fittings.

c. Fire standpipe for Floors 17 through 31 shall be extra strong, Schedule 80 black steel pipe conforming to ASTM A53. Fittings for Floors 20 through 31 shall be threaded, malleable iron, Class 300, 800 #WWP. Fittings for Floors 17-19 shall be Class 300, 1000 #WWP.

d. Sprinkler Heads

1. Only new sprinklers shall be employed in the installation of sprinkler systems as per NFPA 13 Section 1-8.1.1.

2. In all finished areas, sprinkler heads shall be Reliable Automatic Sprinkler Co., Model G-4 BS&A No. 587-75-SA with a 165°F temperature rating. The cover plate of heads must be chrome plated not factory painted white. For 1, 2 and 5 WTC orifice size shall be 1/2" with a 165°F temperature rating and centered on ceiling tiles within ± 1/2 inch.

e. Valves

1. All valves shall be approved by the Underwriters and authorities having jurisdiction.

f. Double Interlock Pre-Action Sprinkler System

1. Provide and install an approved double interlocked supervised pre-action sprinkler system as manufactured by Reliable Sprinkler Company consisting of a closed sprinkler heads, piping, fittings, valves, hangers, emergency pull stations, and a Releasing control panel and detectors as required for a complete and functioning system. System shall be in full accordance with the requirements of the Department of Buildings of the City of New York and the Port Authority of New York and New Jersey.

2. Components: The following components are required for the Type "D" Double Interlock Pre-action System:

a) Model "A", 2½" deluge valve with basic trim set and the wet pilot line trim set and piping to control the flow of water into the piping.

b) Air Check Valve: Located above the deluge valve, the grooved 250 pound air check valve shall be capable of holding the air pressure in the system without priming water and provide tapped outlets for the air line, auxiliary drain and gauges. Reliable Model G "The Right-Check". (Model G Air Check Valve shall be included in the trim package.)

c) Trim: The trim package shall provide the pipe, fittings, nipples and valves required to operate the valve.

d) Heat detector shall be base building standard rate compensation/fixed temperature type. Detector portion shall be twist lock removable from a pre-wired base. Refer to electrical drawings for quantities and locations.

e) Air Supply: Provide and install a sufficiently sized tank mounted air compressor with pressure switch, gauge with an approved air maintenance device. The air maintenance device shall include strainer, regulator, check valve, shut-off valves and bypass valve. It is critical that the air supply be available 24-hours a day for each day of the year. Air compressor shall also include pressure switch, shut-off valve, drain valve, and safety valve. Compressor shall be oil free air, no lubrication required with corrosion resistant spares and a "Regardless of Reason Guarantee".

f) Model A-2 Pressure Maintenance Device shall be used with tank mounted air compressor. The regulator in the Model A-2 Maintenance Device shall reduce the pressure from the compressor (175 PSI) to the desired pressure. Adjustable range shall be 5 to 75 PSI; Maximum Inlet Pressure shall be 175 PSI.

g) Manual Emergency Station (Electric): Provide a Notifier Model BNG-1F Two Pole Station. Station shall be UL listed and NYC BS&A No. 750-76-SA. Once activated, the door shall remain open as a positive indicator of operation until the door is reset with a key.

h) Releasing (Actuation) Control Panel: The releasing control panel shall perform several functions. After receiving an alarm signal from the detectors, the panel shall go into alarm status and in the cross zone configuration the panel shall go into alarm but shall not open the solenoid valve in the valve trim. After the panel receives a second detection alarm, the panel shall open the solenoid in the deluge valve trim. The panel shall also supervise the solenoid valve circuit as well as the detection circuits. The panel shall be capable of supervising the system control valve. Auxiliary outputs shall be provided to shunt trip power, notify central stations, or annunciate on remote devices. A combination power supply/battery shall be provided as a part of the panel. The panel shall have a minimum of 60-hours of battery backup. Panel shall have eight supervised signal indicating device circuits.

i) Air conditioning equipment that has been shut down in response to a signal from the pre-action panel shall not restart until:

1) The condition causing fan shut down has been cleared and the panel reset and

2) A manual fan restart button at the pre-action control panel is operated.

j) Releasing (Actuation) Control Panel shall be Notifier Model 5000 with the modules listed below:

IZM-8 Initiating Zone Module with eight Style "B" (Class "B") initiating zones.
CRM-4 Control Relay Module with four Form "C" Relay Contacts.

Note: Contacts used for fan shut down shall be wired to operate in conjunction with a reset button.

TCM-4 Time Control Module Release Module shall provide for independent release circuit search with programmable cross zone timer.

MPS-24 Power Supply Module with 60-hour backup.

System shall include:

1) Alarm Bell/Strobe 10 inch Bell with 70,000 C.P. strobe (Wheelock No. 46T-G10-24-WS-24-RF).

2) Low Air and Tamper Bell/Strobe 6 inches Bell with 70,000 C.P. Strobe (Wheelock No. 46T-G6-24-FR).

3) System Trouble Horn: Wheelock EH-ELI-R.

k) Solenoid Valve: (Honeywell 73218BNUNLVNOC111C2) The solenoid valve shall control the release of water pressure from the push rod chamber. When the releasing panel receives a signal from a detector in alarm and an alarm from the air pressure switch the panel shall power the opening of the solenoid valve and shall continue to keep the solenoid valve open as long as the panel is in the alarm mode. When the alarm condition is corrected and the panel and valve have been reset the solenoid shall close.

The solenoid valve shall be normally closed and shall require power from the releasing panel to open. The circuit to the solenoid valve shall be supervised and the releasing panel shall be provide with battery backup to provide the necessary power and supervision.

l) Control valves shall be supplied with Acme Fire Alarm Co. Type OSY-U tamper switches.

m) Sequence of Operation: For water to flow into the system two events must take place. Upon both a detector operating and the air pressure switch operating, the cross zoned releasing panel shall open the solenoid valve and allow the water in the top chamber to drain. The water coming into the top due to the restricted orifice will not be able to keep up with the pressure being drained out the drain opening of the solenoid valve. When the pressure drop in the top chamber is sufficient, the deluge valve shall trip and water will flow into the sprinkler piping and out of all fused sprinkler heads. The loss of air pressure alone will only cause an air alarm and cause the panel to go into alarm but will not cause the panel to open the solenoid valve. A detector operating alone will cause the panel to go into alarm but without an accompanying loss of air the panel will not open the solenoid valve. Thus the term double interlock is used to describe the system. The releasing panel will lock into the alarm mode when the detector and the air pressure switch is returned to normal and the panel can be reset to return the system to the ready condition. If the system has lost air, the air will have to be replaced and the panel cleared to return the system to the ready condition. Detectors shall be the first zone of the cross zoned releasing panel. The air pressure switch shall be the second zone of the cross zoned releasing panel. If the detectors are in alarm, the panel will alarm but will not activate and open the solenoid valve. Since the panel is cross zoned two alarm conditions must exist before the panel will open the solenoid valve. When the panel receives the second alarm condition, the releasing control panel will open the solenoid valve in the trip thus allowing the loss of water

and pressure from the top chamber. If the system has not lost air pressure, the air switch will not be in alarm and will not trip the solenoid valve. this will not allow the loss of pressure in the pressured top chamber and the valve will not open to allow the flow of water into the piping system.

n) Material: Materials and equipment shall be standard products and listed by Underwriters Laboratory and/or Factory Mutual and shall perform as a single system. All components shall be approved by the authority having jurisdiction. Field fabricated equipment will not be accepted and will be grounds for system rejection. All necessary equipment for the proper operation of the equipment shall be provided for the full and complete operation of the system. Contractor to provide all required tamper and supervisory as well as all pressure switches and electric bells required.

o) All equipment and components for the complete pre-action system are furnished under this Contract. All wiring for panels, detectors and final connections for the complete pre-action sprinkler systems shall be under electrical section.

g. Hangers: Supports

1. Furnish and install hangers, brackets, beam clamps, clips, inserts, and mounting devices to support all piping in accordance with NFPA Pamphlet No. 13.

2. Hangers size and spacing shall be within the following limits:

Pipe Size	Maximum Hanger Spacing	Minimum Rod Size
1"	8 ft. o.c.	3/8"
1-1/4" to 2"	10 ft. o.c.	3/8"
2-1/2" to 3-1/2"	12 ft. o.c.	1/2"

The above hanger spacings apply to straight runs of pipe only. At points where valves, specialties, or branch connections are located, additional hangers, or supports shall be used to properly support the load.

h. Escutcheons

1. Unless otherwise noted, provide approved type chrome plated cast brass escutcheons on all exposed piping through floors, walls or partitions in finished areas.

2. Escutcheons on uninsulated pipes shall be held in place by set screws.

3. Where sleeve or fitting projects slightly from walls or partitions, provide special deep type escutcheons to cover each case.

i. Sprinkler Cabinet

1. Furnish new sprinkler cabinet with six (6) extra heads of types required.

2. Location and mounting of cabinet shall be coordinated with Owner.

j. Fire Hose Cabinets

1. Provide series SS1400 recessed hose cabinet as manufactured by Potter-Roemer Inc. Door and frame shall be 18 gauge, No. 304 stainless steel with No. 4 finish and continuous stainless steel hinge. Door shall be fitted with wire inserted, double strength glass and identifying decal for limited visibility of hose valve and rack. Wall opening required: 31"W x 41"H x 8½"D.

2. Provide 2½" x ½"x hose rack assemblies with figure 4075 rough brass angle valve and figure 2712-47 hose rack assembly for 125'-0" of 1½" hose. Provide Figure 2765 pressure restricting device.

SP-5 INSULATION

a. Insulate all sprinkler piping and fittings within (15) feet of exterior wall with Manville Micro LOK Fiberglass pipe insulation with all service jacket, or approved equal. Insulation shall be (1) inch thick with flame spread and smoke developed ratings not exceeding 25/50. (Port Authority Requirement)

b. All insulation (including jacket, or facing and adhesive) shall have composite fire and smoke hazard ratings, as tested by procedure ASTM E-84, NFPA 255 and UL 723 not exceeding a "Flame Spread" of 25 and "Smoke Developed" of 50. (Port Authority Requirement)

SP-6 ALTERATION WORK

a. This contractor shall not interrupt or shutdown the existing sprinkler systems without the Owner's permission. All shutdowns of the existing system shall be coordinated with the Owner, building and local fire department. At the time that such closing or opening of valves and drain-down becomes necessary, the contractor shall notify the Architect: 48 hours in advance, who will then make the necessary arrangements. The Contractor shall keep the shut-down time to a minimum and drainage shall be to a properly connected receptacle without causing damage to other work and property.

b. Remove debris, rubbish and superseded material from the site daily. Clean work to Owner's approval.

c. A fire watch guard with a certificate of fitness shall be maintained during all shut-downs.

SP-7 VISITING THE PREMISES

a. This Contractor, before submitting his bid on the work, must visit the site and familiarize himself with all visible existing conditions. As a result of having visited the premises, this Contractor shall be responsible for the installation of the work as it relates to such visible existing conditions.

b. The submission of a bid will be considered an acknowledgment on the part of the bidder of his visitation to the site. No additional compensation will be allowed for difficulties or additional work related to existing visible conditions.

SP-8 PAINTING

a. All finished painting of piping shall be done under this section.

b. All piping and equipment, whether painted in shop, factory of field, shall be wire brushed and cleaned of dirt, rust, grease and other foreign matter before prime coating.

SP-9 TESTS

a. The entire sprinkler system shall be tested as required in the New York City Building Code and as required by all agencies having jurisdiction.

b. No part of the system to be concealed shall be covered up or closed in until such portions have been tested and approved.

c. Contractor shall notify the Architect, Port Authority and the various agencies, departments and bureaus having jurisdiction in advance of the time that the tests are to be made. Give not less than 48 hours' notice.

d. The contractor shall test the installed sprinkler system in the following manner:

1. Perform hydrostatic tests for all sections of the piping systems installed under this section, at not less than 200 psi pressure for two hours, or at 50 psi in excess of the maximum pressure, when the maximum pressure to be maintained in the system is in excess of 150 psi. The test pressure shall be read from a gauge located at the low elevation point of the individual system, or portion of the system being tested.

SP-10 GUARANTEE

a. This Sprinkler Contractor shall submit in writing (triplicate) a guarantee of this sprinkler work in accordance with the standard conditions as established under the AIA rules and regulations.

b. Such guaranteed shall be for a period of one (1) year after the date of final acceptance of the work, and shall include the making of any repairs which may be required owing to the defective workmanship and materials.

c. The guarantee shall include replacing same at this Sprinkler Contractor's expense, including all other work disturbed by such repairs and work damaged by defective workmanship and materials under this contract, to the entire satisfaction of the Owner.

SP-11 UNIT PRICES

a. General: State in proposal a unit price per head to be added or deducted if additional or fewer heads are required due to a change in design or scope of work. Submit the prices in the following form:

Unit	Increase	Decrease
Flush type head with white coverplate	$_____	$_____

b. Any deletion of heads or nozzles, interchange or substitution in type of heads or nozzles shall be made in accordance with the price established for such changes.

c. The prices shall include (on a unit basis per head) all necessary branch piping, cross mains, fittings, hangers, etc., as required to make the system complete, but shall not include bulk or feed mains or branch piping in excess of 15 feet for a single head or nozzle.

SP-12 INSTALLED COSTS

a. Piping

	Black Steel	Galvanized Steel
1"	_____/ft.	_____/ft.
1¼"	_____/ft.	_____/ft.
1½"	_____/ft.	_____/ft.
2"	_____/ft.	_____/ft.
2½"	_____/ft.	_____/ft.
3"	_____/ft.	_____/ft.
4"	_____/ft.	_____/ft.

b. Sprinkler Heads

Flush Type	_____/ea.
Upright Type	_____/ea.
Sidewall Type	_____/ea.

c. Fire Hose Cabinets with 2 1/2" Angle valve. _____/ea.

d. Pressure restricting device. _____/ea.

e. Double interlock sprinkler system. _____/ea.

SECTION 16000
ELECTRICAL

E-1 GENERAL

a. All work in this section is subject to General and Supplementary Conditions of these Specifications and Port Authority of New York and New Jersey tenant alteration standards.

E-2 SCOPE

a. Include all labor, materials and appliances required for the furnishing, installing, and testing, complete and ready for operation in a manner satisfactory to the Owner, all herein specified, including in general, the following:

1. Light and power wiring and conduit
2. Lighting fixtures and lamps, including electronic ballasts and energy saving lamps
3. Emergency lighting, wiring and conduit
4. Grounding
5. Power panels, lighting panels, circuit breakers and disconnect switches
6. Restoration of fire rating around all wall and floor penetrations
7. Removals and relocations
8. Connections of equipment furnished by others, including power and controls mechanical equipment
9. Installation of new fire alarm devices and associated wiring
10. Preparation filing with the Port Authority all necessary forms associated with the fire alarm work on this project.
11. Break glass stations and associated connections
12. Temporary light and power
13. Cutting, drilling, patching and related work
14. As-Built Drawings & Manuals
15. Test Reports
16. Telephone and data conduit system and ladder packs.
17. Timeclocks
18. Wiring devices, occupancy sensor switches and relays
19. Time clocks, lighting contactors and override switches areas
20. Grounding, including grounding of raised floor
21. Furnishing, installing and testing of the UPS system complete with batteries and all accessories
22. Furnishing, installing and testing of power distribution unit (PDU)
23. Installation, connection and testing of the Computer Room preaction sprinkler system
24. Connections of equipment furnished by others, including power and controls mechanical equipment
25. Protection and re-installation of existing fire alarm devices and wiring
26. Wiremold power strips for trading desks computer room racks

b. The following work shall not be included:

1. Supplying motors, motor controllers and controls, except as otherwise noted

2. Installation and termination of data and telephone cables
3. Finished painting
4. Installation of access doors

E-3 MARKING AND CIRCUIT IDENTIFICATION

a. All panels, and the circuits therein, shall be marked. All circuits originating from these identified sources shall be identified by the Contractor at all disconnect switches, circuit breakers, motor controllers, junction and pull boxes, etc.

E-4 ACCESS DOORS

a. Furnish access doors to the General Contractor for installation by him, where required in finished walls, partitions, etc., for access to junction boxes, controls, etc., concealed behind finished construction. Submit setting drawings showing locations for Architect's approval.

b. Door shall be 20 gauge steel sandwich type, insulated with continuous hinge and flush cylinder lock. Doors not less than 12" x 12" for hand access.

c. Construct frame of 16 gauge steel with four masonry anchors per door. Door shall be Milcor "fire rated access door".

E-5 ELECTRICAL TESTING

a. Provide all necessary meters, instruments, temporary wiring and labor to test and adjust all equipment and wiring installed and/or connected under this Contract, including electrical equipment furnished by others, to determine proper polarity, phasing, freedom from grounds and shorts and operation of equipment. All measuring instruments must be properly calibrated.

b. Whenever any authorities having jurisdiction require that any work be tested or approved, Contractor shall provide proper facilities for access and for inspection.

c. Check all lighting fixtures and receptacles for proper operation.

d. Motors:

1. Make the following tests on all motors before starting up:

   a) Check motor nameplate for horsepower, speed, phase and voltage.
   b) Check coupling alignment and shaft end play.

2. Make the following tests on all motors during or immediately after start-up:

   a) Check shaft rotation. Check bearing temperature. Check motor for smooth operation.

   b) Take a current reading at full load using a clamp-on ammeter. If ammeter reading is greater than the rated full load current, determine the reason for the discrepancy and take the necessary corrective action.

c) Following established procedures, equipment shall be energized after certifications by the Contractor that the installation is satisfactory. All motors and equipment shall be tested for proper operation.

d) Overload elements in motor starters shall be adjusted and checked for suitability to the motor characteristics. Contractor shall replace any overload element that is inadequate. The cause of any motor operating above full load rating should be investigated and the cause removed instead of increasing the overload relay trip rating. These final operational tests shall determine that the installation is correct.

e) Thermographic Testing

1) The Owner may engage the services of an electrical testing laboratory approved by the Engineer who shall take a thermographic scan of all switchgear installed as part of this project. Cost of the testing will be paid by the Owner.

2) Results of this testing shall be made available to the Owner, the Engineer, and the Contractor. Any equipment component or termination showing readings of more than 10 C above ambient temperature shall be repaired by the Contractor prior to contract sign-off and at no additional cost to the Owner.

3) All equipment found to be deficient during the initial thermographic scan shall be retested by the Owner's testing laboratory. Contractor shall continue to take corrective action until subsequent testing indicates that equipment is performing in an acceptable manner.

4) Cost of all thermographic testing with the exception of the first test will be paid by the Contractor.

e. After completion of the project, perform a test of emergency egress lighting system. Test shall be performed after dark (at least 1 hour after sunset); stimulate power failure on all lighting circuits. Take light level readings along paths of egress utilizing a foot candle meter; record readings on a reduced scale (1/16" = 1'-0") floor plan. Readings shall be taken at the midpoint between emergency fixtures at a height of 18 inches above floor. Submit sealed and signed copy of the floor plan and readings to the building management.

E-6 PHASE BALANCING

a. Balance, as equally as possible, the loads connected to each phase of all circuits connected to panelboards.

b. At the completion of the work, check the load current in each phase of each feeder and make such adjustments as are necessary to correct load imbalance. Maximum imbalance shall not exceed 10%.

E-7 SHOP DRAWINGS AND SAMPLES

a. Prior to shipment of equipment or start of installation of system components, submit the following for approval:

7. In general run conduit to lighting fixtures concealed; in mechanical equipment rooms and fan rooms install conduit exposed.

8. Where physical constraints prevent the use of standard threaded couplings, use bolted split couplings as manufactured by Universal or OZ/Gedney.

9. When not terminated in a threaded hub, conduits entering sheet metal enclosures and outlet boxes shall be secured in place by two locknuts (one inside and one outside). Terminate each conduit with a bushing.

10. When running conduits in fresh air intake plenums install a compound filled sealing fitting immediately on the warm or building interior side of the wall where conduit enters and/or leaves the above locations. Conduit run in these cold locations shall slope toward sealing fittings, and away from outlets and devices. Sealing fittings shall be drainable type, Crouse Hinds type EYD or as acceptable, with drains toward cold sides. Install fittings at low points in the conduit system to permit draining of moisture. Where possible, conduits shall enter these locations from below. Terminate all conduits at outlets and devices in these spaces with threaded hubs.

11. Provide sealing fittings Crouse Hinds Type EYD, in conduit runs in hazardous locations as follows:

    a) Adjacent to all arc producing devices (switches, motors, etc.).
    b) At boundry between hazardous and non-hazardous areas.

12. Use flexible metallic conduit from outlet boxes in hung ceilings to lighting fixture housings. The final raceway connection to motors, transformers, and other equipment subject to vibration shall be flexible metallic conduit. Use aluminum flexible conduit with aluminum rigid conduit, and flexible steel conduit with EMT or IMC.

13. Where flexible connections are required in hazardous locations, use explosion-proof, braided bronze fittings, Appleton Type EXGJH, or approved equal.

14. Where a flexible raceway is installed in plenums or other indoor locations where exposed to continuous or intermittent moisture, use liquid tight flexible conduit installed in such a manner that liquids tend to run off the surface and not drain toward the fittings. Provide sufficient slack to reduce the effects of vibration.

15. Where flexible conduit is used as a wiring method, to run wiring to new receptacles in existing GYP Board walls, provide a separate ground conductor. Bond ground wire to the conduit grounding system at the first J-Box.

16. All empty conduits, except those which are vertical for their entire length and except conduits connecting ceiling lighting outlets together, shall have a fish wire installed.

b. Concealed Conduit:

1. Install conduit so as not to cut or run through structural members, except by special written permission of the Engineer.

2. Do not run conduits horizontally or crosswise in building type partitions or side walls.

3. Except for branch circuit work install all conduit in hung ceiling on acceptable hangers and inserts. Conduit for branch circuit work and control and instrument wiring shall be supported by clamps or pipe straps supported from the purlins (black iron members supporting the ceiling where available), or from structural members or from the deck.

4. In lay-in ceilings install conduit high enough to permit removal of ceiling panels.

5. Flexible conduit (Greenfield) installed under raised floor shall be secured to the floor slab 10 feet on centers.

c. Exposed Conduit:

1. Run exposed conduit and extensions for concealed conduit systems parallel with or at right angles to the walls of the building, to present a neat and workmanlike appearance.

2. Support rigid metallic conduit runs on each side of bends, and not greater than 10'-0" on centers. All other conduit shall be secured as required by Code.

d. Expansion Fittings:

1. Install conduit expansion fitting in each conduit run wherever it crosses expansion joint in the structure and where ever the conduit run exceeds 140 feet. Expansion fittings shall be OZ/Gedney Type AX with Type BJ bonding jumper or as acceptable.

e. Conduit Types:

1. Rigid Steel Conduit

a) Full weight steel pipe, hot dip galvanized inside and out. Conduit shall conform to UL Standards for rigid steel conduit. Zinc coating shall be sufficiently well bonded and elastic to prevent flaking or cracking when bent 90^0 with a radius 6 times the inside diameter.

2. Aluminum

a) Aluminum conduit shall conform to ANSI Standard C80.5 and UL Standard #6 for rigid aluminum conduit. Interior of conduit shall have a silicone or as acceptable coating; all threaded couplings shall be made up using an application of Penetrox "A" or other acceptable joint compound.

3. Flexible Metallic

a) Flexible metallic conduit shall be threadless, continuous, spirally wound and interlocked, aluminum or zinc coated steel conforming to UL Standard #1 for flexible metal conduit.

4. Electric Metallic Tubing

   a) Electric metallic tubing (EMT) shall be threadless type, steel, conforming to ANSIStandard C80.3 and UL Standard #797, with fused zinc on outside and inside walls with an additional high corrosion-resistant finish coat.

5. Armored Cable (BX)

   a) BX may not be used.

f. Conduit Fittings:

1. Rigid Threaded Conduit

   a) All bushings for terminating conduit 1" and smaller shall be cast threaded type with smooth edge to prevent injury to wire and cable. Use aluminum bushings for aluminum conduit.

   b) Use insulated grounded bushings for conduits 1-1/4" and larger. Insulated grounded bushings shall be cast, threaded type equipped with a lug for grounding. Upper edge shall have a nylon ring or bakelite ring which is molded into the bushing. Ground lug shall be sized to take conductor sized according to Code with a minimum size of No. 12 Use aluminum locknuts and bushings with aluminum conduit. Use steel locknuts and bushings with rigid steel conduit and IMC.

2. Thinwall (EMT) Conduit

   a) Where electrical metallic tubing is installed, the connectors and couplings shall be the raintight, compression type. The connectors and couplings shall be the nylon insulated throat type as manufactured by The Thomas & Betts Co., Series "5120" and "5123", respectively, or as acceptable. On tubing larger than 1" use bonding locknuts.

3. Flexible Metallic Conduit (Greenfield)

   a) Where flexible metallic conduit is installed connectors shall be the Tite Bite type with nylon insulated throats as manufactured by The Thomas & Betts Co., Series "3110", or as acceptable.

4. Liquid Tight Flexible Steel Conduit (Sealtite)

   a) Where terminating liquid tight flexible steel conduit (Sealtite), fitting assembly shall be sealing type consisting of steel gland, nylon ring and ground cone on the outside and a nylon insulated throat fitting on the inside. Fittings shall be Thomas & Betts Co., Series "5331", or as acceptable.

g. Structural Supports:

1. Provide structural support system as required for supporting panelboards, switches, ducts, conduits, and various electrical items of equipment as indicated on drawings.

2. Support system shall consist of lengths of double channels 1-1/2" wide x 1-7/8" deep, 7/8" continuous open slot channel of minimum 12 gauge, cold-formed, electrogalvanized steel.

3. Supports shall be Kindorf Channel #B-909 structural channel.

E-9 CONDUCTORS

a. Wire and Cable (600 Volt Building Wire):

1. Unless specified otherwise all wires No. 10 AWG and smaller shall be solid; No. 8 AWG and larger shall be stranded.

2. No wire shall be drawn into a raceway until work of a nature which may cause injury is completed. Use acceptable lubricants.

3. Unless otherwise indicated all control wiring shall be No. 12 AWG. Minimum size wire for power or branch circuit work shall be No. 12 Awg. Use No. 10 AWG wire to the first outlet for branch circuit runs more than 70 feet for 115 volt circuits. All control and circuit wires in cabinets, boxes, panels, pull and junction boxes shall be trained neatly and tied.

4. All wires and cables shall be continuous from origin to destination without splices unless written permission is given by the Engineer. In branch circuit wiring, make connections to fixtures or devices using "T" taps only.

5. All 600 volt wire and cable unless otherwise specified shall be single conductor suitable for use in wet and dry locations.

6. All conductors shall be annealed copper.

7. All wiring shall have copper conductors and XHHW insulation. Branch circuit wiring shall be No. 12 AWG minimum. No. 14 AWG wiring may be used for control work only. All branch wiring must be factory color coded for its entire length. For feeder wiring No. 1/0 AWG and larger colored stripes along the full cable length is acceptable with all visual areas taped with applicable color type.

8. All wire and cable shall be color coded as follows unless otherwise authorized:

	Color	
	208Y/120V	277/480V
Phase	AC	AC
A or 1	Black	Brown
B or 2	Red	Orange
C or 3	Blue	Yellow
Neutral	White	White
Dedicated Neutral	White w/stripe of same color as matching hot leg	
Equipment Ground	Green	
Isolated Ground	Green w/Yellow Stripe	
Switch Legs	Purple	

Where two different voltage systems are run in the same raceway (special situations), use gray or white with a stripe (not green) for one of the neutrals.

9. All cables in indoor dry locations in pull, splice and cable support boxes, in panels and points of termination shall be bundled and laced by circuits and tagged using nylon tywrap material, flame resisting tags of adhesive material or coded sleeves. Tags shall identify cables and pieces of equipment served. Tags shall be T&B "TY-RAP" or "E-Z Code" or as acceptable. All cables, power and signal shall be routed and trained by system.

10. Tag all cables in interior damp locations with stainless steel, zinc or lead embossed tags secured with tinned copper wire. Tags shall be as manufactured by The Thomas & Betts Co. or as acceptable.

11. Provide cable supports of the threaded metal conduit fitting type with inside tapered, and with a non-metallic insulated tapered plug with cable openings and complete with grounding lug in all pull boxes as required by Code. Support shall be OZ/Gedney type "RL" for steel conduit, and "RLA" for aluminum conduits or as acceptable.

12. On each panel or interconnection box and on the entire system, circuits shall be connected so that the load on each phase shall balance within ten percent with all lamps burning and all equipment in operation.

13. All splices and connections outdoors or in interior damp locations shall be sealed with Minnesota Mining "E-Z Seal" or as acceptable.

b. Connectors: Splices and Taps for 600 Volt Wire and Cable

1. For Wire No. 8 AWG and Smaller (Power Conductors Only)

a) Splices and taps shall be pressure indent type with insulated cover; or insulated, rustproofed spring thread-on type. Manufacturer's recommended tooling shall be used.

b) Except where terminating in panelboards, switches, and motor controllers all terminations shall be made with compression lugs. The manufacturer's recommended tooling shall be used to apply. Where compression terminals are not isolated safely from other metallic parts, the nylon self-insulated type shall be used. Lugs shall be Burndy "Insulug" or as acceptable.

2. For Cable No. 6 AWG and Larger

a) Except in motor controllers, switches and in panelboards where lugs cannot be changed, all cables shall be terminated, spliced and tapped with color keyed, double indent compression connectors as manufactured by Thomas and Betts Co., Series 54000 or as acceptable. Manufacturer's recommended tooling shall be used to apply. Lugs shall be the two hole type. Insulate all splices and taps with heat shrinkable insulation, Raychem or as acceptable.

3. For low voltage signal and communications systems (#10 AWG and Smaller)

   a) Splices shall be made only where permitted by the manufacturer of the particular system.
   b) Terminations and permitted splices shall be made up at terminal blocks only using box lug type terminal strips (Square D Type G or equal).

E-10 LIGHT AND POWER MATERIALS

a. General:

1. Outlet Boxes

   a) In centering outlets, allow for overhead pipes, ducts, etc., and for variations in arrangement and thickness of fireproofing and plastering, also for window trims, paneling, etc., and any inaccuracy resulting from failure to do this must be corrected without expense to the Owner.
   b) Mount outlet boxes for similar equipment in the same or similar areas at uniform heights. Where mounting heights are not indicated, locate outlets as required for the equipment connected thereto. Unless directed otherwise by the Owner or by the drawings the mounting heights to centerline of outlet boxes shall be as indicated by the Architect.
   c) Install outlets in accessible locations. Where metal wainscot or finish is removable, install outlets to permit removal of metal wainscot or finish without removing the outlet box.
   d) Close all unused openings in outlet boxes with knockout closers.
   e) Provide blank plates attached by means of "bridges" on outlet boxes in which no device is installed.
   f) Use cast boxes for exposed work.
   g) Use stamped metal in "1900" boxes under raised floor.
   h) Fasten outlet boxes securely. Use hangers to support ceiling outlets, except in lay-in type hung ceilings, where boxes may be supported by the conduit carrying the branch circuit wiring provided the first conduit support on either side of the box is within three feet of the box.
   i) All exposed outlet boxes shall be attached to permanent inserts. Where this is not possible the concrete shall be drilled, metal expansion sleeves shall be installed and boxes shall be secured using machine screws.
   j) Covers of all boxes under raised floor are to have circuit identification painted thereon.

2. Switches

   a) Locate switches near doors at the strike side of doors as finally hung.
   b) Switch the ungrounded wires of circuits.
   c) Mount switches with the long dimension vertical and the operation handle in the upward position when in the ON position.

3. Pull, Tap and Cable Support Boxes

   a) Provide pull, tap and cable support boxes where indicated on the drawings, required by "Codes" and as required to facilitate installing of wire and cables.

4. Isolation of Feeders

   a) Completely isolate from one another cables originating from different service takeoffs. Do not place in same enclosures unless suitable and acceptable isolation barriers are provided. This applies to all boxes, cabinets, pull boxes, cable support boxes, etc.

b. Outlet Boxes:

1. Sheet Steel

   a) Sheet steel outlet boxes shall be galvanized and complete with galvanized steel cover and/or extension collar as required.
   b) Concrete boxes shall be 4" octagon with a removable backplate and 3/8" fixture stud, if required. Depth of box shall allow for a minimum of 1" of concrete to be poured above the backplate.
   c) Switch, receptacle and wall outlet concealed boxes shall be a nominal 4" square, 1-1/2" or 2-1/8" deep as required with a raised cover, unless otherwise indicated on the drawing. Provide 3/8" fixture stud as required. Ganged outlet boxes shall be of sufficient length to suit conditions.
   d) Lighting fixture boxes shall be 4" octagon with 3/8" fixture stud. For suspended ceiling work, Provide a 4" octagon with removable backplate where required.
   e) *Junction outlets shall be same as above outlets but without stud, and shall be* furnished with covers to suit each condition and as directed.
   f) Dimensions shown on drawings take precedence over dimensions called for herein.

2. Cast Type

   a) Cast outlet boxes shall be anodized cast aluminum when used with aluminum conduit, type FS or FD, with threaded hubs and matching gasketed covers as required without overlapping edges or corners.

c. Wiring Devices:

1. Install to bear evenly and truly, secured on axis of supporting members.

2. Where boxes are back of finished surface, use recess collars and proper length screws, of size to form shoulder at exact point to retain switch in position. Do not use not wooden wedges shims or blocks for truing up.

3. Local Wall Switches: Slide, quiet type, and rated 20A ampere, 120/277 volts. Single Pole: Lutron linear slide switch NT-1PS, NT-3PS for three-way.

4. Insertion Receptacles:

   a) General Use: Specifications grade, duplex, 15 ampere, 125 volts, 3 pole (third pole "U" shaped grounding). Lutron NTR-15.

   b) General Use: Specification grade, single 20 ampere, 125 volts, 3 pole (third pole "U" shaped grounding). Duplex 20 ampere as above: Lutron NTR-20.

5. Special receptacles as indicated and/or required.

6. Device Plates: Lutron Nova-T.

7. Device and plate cover colors as selected by Architect.

d. Disconnects:

1. General

a) Disconnects shall conform to NEMA and UL Standards, and be installed where indicated and where required by Code. Disconnects shall be horsepower rated units to maximum size listed by UL.
b) Disconnects shall be located where they are readily accessible and capable of being used without reaching above, around, under, etc., equipment and/or obstructions.

2. Switching Mechanism

a) Provide quick-make, quick-break mechanism with external operating handle mechanically interlocked with enclosure cover to provide normal access to inside of enclosure when disconnect is in OFF position only. Provide means to lock the operating handle in the OPEN and CLOSED position. Designate on the enclosure the OPEN and CLOSED position of the operating handle.
b) Switches shall be of the double stationary contact type.
c) Switches shall be fusible or non-fusible as shown on the drawings and/or as required. Fused switches shall be equipped with rejection type fuse holders and shall be furnished complete with fuses.
d) Each safety switch shall be single-throw, mounted in separate heavy duty industrial enclosure, with arcquenching device on each pole for all disconnects, and with means to bypass the mechanically interlocked door and handle. Switches shall be General Electric "QMR Heavy Duty Type" or as acceptable.
e) All disconnects shall be rated 600 volts.

3. Enclosure

a) In general all switches in indoor, dry locations shall be mounted in NEMA Type 1 enclosures.

b) Switches in Class I, Division I, Group B Hazardous Location shall be mounted in NEMA 7 enclosures.

c) Switches located outdoors shall be mounted in NEMA 3R enclosures.

4. Identification

a) Provide nameplate identifying the system and defining the designation and function for all disconnects.

b) Each unfused switch also shall have a nameplate reading: FOR ISOLATING USE ONLY. DO NOT OPEN UNDER LOAD.

c) Nameplates shall be mounted on the front cover secured with self-tapping screws or nuts and bolts. Nameplates shall be laminated phenolic, black with a minimum of 1/4" high white lettering.

e. Lighting and Power Panelboards (Type LP, RP and CP)

1. Furnish and install three-phase, 4 or 5 wire, copper bus bars and main lugs, with 2, 3 or 4 wire branches, as noted. Quantity and capacity of panels and circuits as shown on drawings. All panels shall have a ground bus.

2. Cabinets: Code gauge galvanized primed and painted sheet steel with trim and lockable door. Lap and rivet corners or form as approved. Panel trim shall be mounted via trim clamps or shall be screw mounted. Door shall be mounted with hinges and shall be provided with multi-pin cylinder locks with milled keys. All panels to be keyed alike. Keys to be cut as directed.

3. Directory Holder: Metal frame with nonbreakable transparent cover and directory card. Entries to be typewritten by installer.

4. Panelboard construction for bolted type circuit breakers.

5. 120/208 Volt Panels: Minimum short circuit rating 10,000 amperes, rms symmetrical. 277/480 volt panels: Minimum short circuit rating 14,000 amperes, rsm symmetrical.

6. Minimum Gutter Space: For panels with main buses rated over 100 amperes, 5-3/4" minimum on all sides.

7. Panels shall have 3-pole main circuit breaker or main lugs only and quantity, poles and trip ratings of branch circuit breakers as scheduled. Where indicated, provide shunt trip main circuit breaker.

8. All main and branch bus bars, neutral and isolated ground bus bars, cable lugs and all connectors to be made of copper. Dual rated alloys or aluminum not permitted.

9. All circuit breakers shall have copper lugs, whenever possible.

10. Panels shall have engraved white core, black lamicoid nameplate screwed on to panel trim.

11. Panels shall be equal to General Electric type "NLAB", as manufactured by Electric Switchboard or approved equal.

f. Molded Case circuit Breakers

1. Provide all new circuit breakers for new and existing panels as required in accordance with the panel schedules.

2. Electrical contractor may reuse circuit breakers in other existing panels provided that they are in good operating order and in compliance with the requirements listed below. Provide new breakers in existing panelboards as needed to comply with the panel schedules.

3. General characteristics of molded case circuit breakers shall be:

   a) Single, 2 or 3 pole, as noted.
   b) Thermal-magnetic type.
   c) Mechanism: Quick-make, quick,break, trip-free type.
   d) Contacts: Non-welding.
   e) Automatic Tripping: Clearly indicated by handle automatically assuming position distinctive from normal "ON" and "OFF" positions.

4. All circuit breakers shall have interrupting capacities adequate for their locations, generally. Unless indicated otherwise, the interrupting capacity of any circuit breaker shall be greater than the let-through current of the protective device next ahead of it in the distribution system. All 120 volt circuit breakers shall be rated for not less than 10,000 amperes interrupting capacity. All 277 volt circuit breakers shall be rated for not less than 14,000 amperes interrupting capacity.

5. Interrupting capacities referred to are symmetrical values, RMS according to NEMA standards.

6. Circuit breakers to be bolt-on type as manufactured by General Electric, Westinghouse, Square D or ITE.

g. Fuses

1. Fuses where required for circuits below 600 volts shall be high interrupting capacity, dual element, UL Class RK-1 current limiting rejection type, Bussmann Type LPS-RK, LPN-RK or as approved .
2. Provide 33% spare fuses of each size.

E-11 GROUNDING

a. Provide complete systems and equipment grounding as shown on the drawings and/or described herein. All ground wires shall be stranded type.

b. Ground conductors shall be insulated and colored green or colored green with a yellow stripe or stripes. Ground conductors always shall be run inside raceways or enclosures with phase conductors.

c. Connect system components mechanically and electrically to provide an independent return path to the grounding electrode.

d. Clean metals thoroughly where ground terminal connectors are brazed to equipment and repaint impaired surfaces.

e. Size ground conductor in accordance with New York City Electrical Code requirements, except do not use conductor smaller than No. 10 AWG.

f. Extend existing grounding system to include all the electrical work in the scope of this alteration.

g. Equipment grounding shall consist of connecting electrically non-current carrying conductive equipment enclosures and raceways as shown on the drawings.

h. Ground motors by connecting a green covered conductor from a grounding bushing in the starter to the motor frame. Conductor shall be installed inside the conduit with the circuit conductors, and terminated in the motor connection box. If this is not feasible, terminate grounding conductor using a listed or labeled "G" clip or ground screw. Conduit size between starter and motor shall be increased if necessary to accommodate the addition of the ground wire.

i. Provide a ground bus in all new panelboards and connect a green insulated conductor from the grounding terminal of each receptacle designated to feed non-linear load to the ground bus of the panelboards. Connect the ground bus to the incoming ground wire from the neutral point of the associated transformer.

j. Ground lighting fixtures by connecting a green covered conductor from the ground lug welded within the fixture housing to a grounding conduit bushing or acceptable grounding clip in the first outlet box. Run grounding conductor inside raceway with circuit conductors.

E-12 MOTORS AND APPARATUS FURNISHED BY OTHERS

a. Install all wiring in conduits. Connect conduit to motor conduit terminal boxes with 18" to 24" of flexible conduit from end of conduit to motor terminal box. Conduit shall not terminate in or be fastened to motor foundation. Allow clearance for motor removal.

b. Provide connections to all motors, controllers, disconnects, lockout, actuating and control devices. Conductors to motors same as to controllers except as noted.

c. Motors, controllers, and control devices will be supplied under other sections of work, except as noted.

d. Accept delivery of controllers, erect on walls as indicated and wire under this Section except as noted.

e. Wire to all motor and actuating devices supplied and installed under other Sections of work except as noted.

f. Furnish disconnect switches under this Section except as noted.

g. Coordinate motor terminal and connection box size with Section of work supplying and installing motors.

h. Leave motor, control and actuating equipment ready for operation.

i. Ascertain exact locations of controllers and control services prior to installation and wiring.

E-13 ELECTRICAL CONTROLS AND POWER WIRING

a. Provide power and control wiring to all electrically operated equipment devices furnished for this project. All controls shall be on ungrounded side of control circuit.

b. Wire and connect the electrical, heating, ventilating, air conditioning protection and control devices and audio/visual systems except as otherwise noted.

c. The electrical Contractor shall wire up all devices and equipment so as to provide a fully operating and satisfactory system.

d. All control wiring shall be installed in conduit.

E-14 LIGHTING FIXTURES

a. For detailed information on lighting fixtures refer to the detailed lighting fixture schedule which is on the Architectural drawings.

b. New lighting fixtures shall comply with or exceed the latest requirements of the National Code and shall bear the label of the Underwriters' Laboratories, Inc. All fluorescent fixtures shall be equipped with electronic ballasts having less than 20% harmonic distortion. All ballasts shall be Class "P" rated. Hybrid ballasts shall not be used. Compact fluorescents shall have high power factor ballasts.

c. Furnish and install new lighting fixtures of the types indicated at each location where called for on the drawings.

d. Do not scale drawings for exact locations of the lighting fixtures. Drawings are intended only to be indicative of proportional spacing for the effect desired. In general, the architectural reflected ceiling plans indicate the proper locations of lighting fixtures.

e. Furnish and install required lamps in every new lighting fixture of wattages, quantities, and types specified and shown on the drawings. Consult Architectural Drawings for fluorescent phospher requirements. Fluorescent fixtures may be furnished to the jobsite pre-lamped.

f. Furnish each fixture with not less than 6'-0" of wire in 3/8" flexible metallic conduit for connections to outlet box. Wire size shall be not less than #12 AWG. Tails may be factory installed.

g. Final finish on all light reflecting surfaces and exposed trim on fixtures shall be baked white enamel unless specified otherwise.

h. Install each fixture properly and safely. Furnish and erect hangers, rods, mounting brackets, supports, frames and other equipment required. Existing hardware in good condition may be reused.

i. Support all lighting fixtures independently of ductwork or piping.

j. Recessed incandescent and compact fluorescent fixtures shall have a 4" pullbox permanently attached to the plaster ring so that it is accessible when the fixture trim or reflector is removed. Connection between fixture and pullbox shall be of sufficient length so that when the fixture is dropped, the pullbox is readily accessible.

k. Recessed fixtures in ceilings shall be provided with the proper trim and mounting hardware compatible with the ceiling system being installed.

l. In all mechanical equipment areas, lighting fixtures shall be installed on ceilings after all piping and equipment therein have been installed. Exact locations for such fixtures will be determined at the job site.

m. Electrical contractor shall verify all recess depths of fixtures against AC ducts, pipes, beams, etc., before ordering fixtures and shall submit shop drawings of all fixtures to architect for approval.

n. All conduit and flexible conduit (Greenfield) shall be secured at intervals as required by the Electrical Code of the City of New York.

o. All 2' x 2' and 2' x 4' troffers shall utilize either Biax or T8 lamps exclusively. F40T12 shall not be used. Lamps sockets shall have silver plated contacts. See architectural drawings for detailed specifications.

p. All lay-in type troffers shall be secured with "Earthquake Clips".

q. Incandescent lamps shall be rated for 125 volts.

r. Fluorescent troffers shall be equipped with heat extraction slots.

E-15 FIRE STOP SEALANT

a. Provide fire-resistant silicone foam fill to restore fire ratings to all wall or floor or ceiling penetrations. Foam fill must be UL classified and have Materials and Equipment Acceptance (MEA) listing for use as wall or floor opening multiple cable system protective material.

b. All penetrations through fire rated floors and wall shall be sealed to prevent the passage of smoke, fire, toxic gas or water through the penetration either before, during or after a fire. The fire rating of the penetration seal shall be at least that of the floor or wall into which it is installed, so that the original fire rating or the floor or wall is maintained as required by Article 300-21 of the National Electric Code.

c. No flammable material may be used to line the chase or hole in which the fire stop material is to be installed.

d. When damming materials are to be left in place after the seal is complete, then all such materials shall be non-flammable.

e. The sealant shall be poured into the hole after each cable or pipe has been spread to allow approximately 1/2" of foam to flow between them. No cable or pipes may be touching each other and thereby allow voids to form in the fire stop.

f. When plastic cartridges are used for smaller installations, the chemical components of the foam shall be premeasured within the cartridges to insure the proper ratios. For larger installation, where a Chase-Foam Mixing Machine is used, the machine should be preset so that only the correct ratio of the two chemical components will be delivered without any possibility of error and without the need for constant technical supervision.

g. The sealant shall remain resilient and pliable to allow for the removal and/or addition of cable without the necessity of drilling holes. It shall adhere to it self perfectly to allow any and all repairs to be made with the same material. It shall allow for vibration, expansion and/or contraction of anything passing through the penetration without affecting the seal, or cracking, crumbling and spalling.

h. When sealant is injected into a penetration, the foam shall expand to surround all the items within the penetration and maintain pressure against the walls of the penetration as well as the pass-through items. The foam shall cure within five minutes and be fire resistant at that time. No heat shall be required to further expand the foam to block the passage of fire and smoke or water.

i. The foam sealant shall have been subjected to fire exposure in accordance with standard time-temperature curve in the Standard, UL, ASTM E119, and NFPA 251. The foam fire-stop shall have also been subjected to the hose stream test in accordance with UL 10B. The foam sealant shall be UL Classified as a Fill, Void or Cavity material for use in Wall or Floor Openings. The foam sealant shall be UL Classified 3M Fire Barrier CP-25.

j. Coordinate application with physical parameters of openings to be sealed. Provide solid bottoms, and solid covers and tray-to-box connectors where wireways or other cable support systems penetrate fire rated walls.

k. Multiple conduit floor slab penetrations shall be filled in with concrete to maintain structural integrity of floor.

E-16 PRE-ACTION CONTROL SYSTEMS

a. This contractor shall install, connect and test the automatic smoke and heat detection systems and associated controls for the pre-action systems indicated on the drawings. All components of these systems will be furnished by the sprinkler contractor. Refer to the sprinkler specifications for more information.

b. All wiring used for interconnection of these sub-systems shall shall be run in rigid conduit. This includes all wiring used to connect the sprinkler control solenoid, the compressor, power feeds, and the connections to the building Class "E" system.

c. Furnish and install fused cutout boxes where shown on the plans for power feed to the smoke detection control panel. Fused cut-outs shall be 3-pole, 30 amp rated with 2-20 amp fuses and solid copper tube neutral. Screw cover sheet metal housing shall be painted red and identified by an engraved nameplate (red letters on a white background) with the legend PRE-ACTION SYSTEM FUSED CUT OUT. Nameplate shall be mounted with screws.

E-17 TELEPHONE AND SIGNAL/DATA CONDUIT SYSTEM

a. For wall mounted telephone/data outlets provide outlet boxes with "EMT" conduit stub-downs into the raised floor with bushings on the end. The telephone/data faceplates will be furnished and installed by others.

b. Stub-downs shall consist of empty electrical metallic tubing (EMT) from the telephone outlet box to the raised floor plenum.

c. Consult and install all necessary equipment in full conformity with the requirements of Robert Derector Telecommunications.

E-18 RECORD DRAWINGS (AS-BUILTS)

a. Concurrent with progress of installation, maintain a set of as-built record drawings, consisting of a reproducible marked set of mylar drawings with additional sketches as required, denoting and dimensioning accurately all changes in elevation, location and size of all items deviating from contract drawings.

b. Within three weeks following beneficial occupancy of the project, two Diskette containing "As-Built" drawings with (4) sets of as-built blue line and two sets of maintenance manuals, operating manuals and drawings (including shop drawings) of all electrical equipment shall be submitted to the Owner.

E-19 FIRE ALARM SYSTEM FIELD TESTING PROCEDURE

a. Summary

The following parameters apply to field wiring (installed by the Contractor), connected to the new Pyrotronics MXLV Fire Alarm (F.A.) System.

b. References

1. The following is a list of references in this section:

New York City Electrical Code.

New York City Building Code.

Cerberus Pyrotronics MXLV-10M Manual.

c. Scope of Work

1. After installation, perform the tests as outlined in part 2 of this specification.

2. A copy of all test result reports, together with an outline of the test method used, shall be submitted to the Engineer for review and approval.

3. Should any of the test results reveal defects, promptly correct such defects, and rerun the test until the entire installation is satisfactory to the Engineer.

4. All test results shall be recorded and submitted on test result reports.

d. Speaker Wiring

1. General

a) Speaker Wiring Circuits (See Drawing FA-1 for specification)

1) Speaker circuit "A" - 1 pair

2) Speaker circuit "B" - 1 pair

2. Sequential Test Procedures

a) Install all field wiring (including stripping of the cable jacket and conductor insulation), heat shrinking and labeling. No connections to be made.

b) Visually inspect cables for physical damage and proper connection, in accordance with the Contract Drawings.

c) "Ring out" all circuits to verify continuity, proper markings and location.

d) Splice through all open connections (except the homerun to TSC and last device cable end), using a temporary "wire-nut" approved by the Engineer.

e) Perform insulation resistance and stray voltage tests.

f) Apply a short between the red and the black conductors at the last device cable end, using a temporary "wire-nut" approved by the Engineer and perform resistance test.

g) After satisfactory completion of all testing, remove temporary "wire-nuts" and connect speakers and end of line resistors (E.O.L.).

3. Execution

a) General

1) Wiring shall be checked and tested by the Contractor, in accordance with this procedure, to ensure that the system is free of shorts, open and ground faults.

2) A copy of all test reports shall be submitted to the Engineer for approval.

b) Test Performance

1) Insulation resistance - Test all wires and cables installed under this contract (and as outlined below), with a 1000 Volt Megohmmeter (megger). Applied potential to be 1000 Volts DC for 1 minute.

Red Conductor to Black Conductor:_____Mohm
Red Conductor to Ground:_____Mohm
Black Conductor to Ground:_____Mohm

2) Stray Voltage - Test all wires cables installed under this contract (and as outlined below), with the Fluke 87 Multimeter

Red Conductor to Black Conductor: _____ AC Volts
Red Conductor to Black Conductor: _____ DC Volts

3) Resistance - Test all wires and cables installed under this contract (and as outline below), with the Fluke 87 Multimeter.

Red Conductor to Black Conductor: _____ Ohms

4) After all test result reports have been approved by the Engineer, remove temporary test connections and connect all wring as shown on the Contract Drawings.

e. Strobe and Horn Wiring

1. Sequential Test Procedures

a) Install all field wiring (including stripping of the cable jacket and conductor insulation), heat shrinking and labeling. No connections to be made.

b) Visually inspect cables for physical damage and proper connection, in accordance with the Contract Drawings.

c) "Ring-out" all circuits to verify continuity, proper markings and location.

d) Splice through all open connections (except the homerun to TSC, and last device cable end), using a temporary "wire-nut" approved by the Engineer.

e) Perform insulation resistance and stray voltage tests.

f) Apply a short between the red and the black conductors at the last device cable end, using a temporary "wire-nut" approved by the Engineer and perform resistance test.

g) After all testing, remove temporary "wire-nuts" and connect strobes and end of line resistors (E.O.L.).

2. Tests

a) General

1) Wiring shall be checked and tested by the Contractor, in accordance with this procedure, to ensure that the system is free of shorts, open and ground faults.

2) A copy of all test reports shall be submitted to the Engineer for approval.

b) Test Performance

1) Insulation resistance - Test all wires and cables installed under this contract (and as outlined below), with a 1000 Volt Megohmmeter (megger). Applied potential to be 1000 Volts DC for 1 minute.

Red Conductor to Black Conductor:_____Mohm
Red Conductor to Ground:_____Mohm

Black Conductor to Ground:_____Mohm
Red Conductor to Shield:_____Mohm
Black Conductor to Shield:_____Mohm
Shield Conductor to Ground:_____Mohm

2) Stray Voltage - Test all wires cables installed under this contract (and is outlined below), with the Fluke 87 Multimeter.

Red Conductor to Black Conductor: _____ AC Volts
Red Conductor to Black Conductor: _____ DC Volts

3) Resistance - Test all wires and cables installed under this contract (and as outline below), with the Fluke 87 Multimeter.

Red Conductor to Black Conductor: _____ Ohms.

4) After all test result reports have been approved by the Maintenance Supervisor, contractor shall remove temporary tests connections and connect all wiring as shown on the Contract Drawings.

f. ALD Loop

1. Sequential Test Procedures

a) Install all field wiring (including stripping of the cable jacket and conductor insulation), heat shrinking and labeling. No connections to be made.

b) Visually inspect cables for physical damage and proper connection, in accordance with the Contract Drawings.

c) "Ring out" all circuits to verify continuity, proper markings and location.

d) Splice through all open connections (except the homerun to TSC, and last device cable end), using a temporary "wire-nut" approved by the Engineer.

e) Perform insulation resistance, stray voltage tests.

f) Apply a short between the red and the black conductors at the last device cable end, using a temporary "wire-nut" approved by the Engineer and perform resistance test.

g) After all testing, remove temporary "wire-nuts" and connect ALD devices.

g. Network Wiring

1. General

a) Wiring shall be checked and tested in accordance with this procedure, to ensure that the system is free of shorts, open and ground faults.

b) A copy of all test reports shall be submitted to the Maintenance Supervisor for approval.

2. Test Performance

a) Insulation Resistance - Test all wires and cables installed under this contract (and as outlined below), with a 1000 Volt Megohmmeter (megger). Applied potential to be 1000 Volts DC for 1 minute.

Red Conductor to Black Conductor:_____Mohm
Red Conductor to Ground:_____Mohm
Black Conductor to Ground:_____Mohm
Red Conductor to Shield:_____Mohm
Black Conductor to Shield:_____Mohm
Shield Conductor to Ground:_____Mohm

b) Stray Voltage - Test all wires cables installed under this contract (and as outlined below), with the fluke 87 Multimeter.

Red Conductor to Black Conductor: _____ AC Volts
Red Conductor to Black Conductor: _____ DC Volts

c) Capacitance - Test all wires and cables installed under this contract (and as outlined below), with the Fluke 87 Multimeter.

Red Conductor to Black Conductor:_____MicroF
Red Conductor to Shield:_____MicroF
Black Conductor to Shield:_____MicroF

d) Resistance - Test all wires and cables installed under this contract (and as outline below), with the Fluke 87 Multimeter.

Red Conductor to black Conductor: _____ Ohms.

e) A copy of all test results reports shall be submitted to the Electrical Engineer for approval.

f) After all test result reports have been approved by the Electrical Engineer, contractor shall remove temporary test connections and connect all wiring as shown on the Contract Drawings.

E-20 BID UNIT PRICES FOR ELECTRICAL WORK

a. Unit prices to be applied for work additions to and deductions from bid prices quoted to systems herein. Price shall include all labor and material as specified and indicated below and inclusive of overhead, profit, sales taxes, excise taxes, engineering all at no additional cost to the owner.

Electrical price shall include all necessary appurtenances such as couplings, pull and junction boxes terminations, etc., Hangers, complete and operable installation. Testing, if required, shall be part of the charge.

1. Furnish and install 240 volt, Nema 1 disconnect switch for the following sizes:

a.	3P-30A unfused	$_____/Each
b.	3P-30A fused	$_____/Each
c.	3P-60A unfused	$_____/Each
d.	3P-60A fused	$_____/Each
e.	3P-100A unfused	$_____/Each
f.	3P-100A fused	$_____/Each
g.	3P-200A unfused	$_____/Each
h.	3P-200A fused	$_____/Each

2. Furnish and install fuses in disconnects and/or switchboards, Bussman low-peak for the following sizes:

a.	30A	$_____/Each
b.	60A	$_____/Each
c.	100A	$_____/Each
d.	200A	$_____/Each
e.	400A	$_____/Each

3. Furnish and install 225A main lugs, 42 Pole, 120/208V, 3 phase, 4 wire lighting panel including 3P-125A main circuit breaker, ground bus. $_____/Each

4. Furnish and install bolt-on circuit breaker in 120/208V panel for the following sizes:

a.	1P-15A C/B	$_____/Each
b.	1P-20A C/B	$_____/Each
c.	1P-30A C/B	$_____/Each
d.	1P-40A C/B	$_____/Each
e.	1P-50A C/B	$_____/Each
f.	1P-60A C/B	$_____/Each
g.	1P-75A C/B	$_____/Each
h.	2P-15A C/B	$_____/Each
i.	2P-20A C/B	$_____/Each
j.	2P-30A C/B	$_____/Each
k.	2P-40A C/B	$_____/Each
l.	2P-50A C/B	$_____/Each
m.	3P-15A C/B	$_____/Each
n.	3P-20A C/B	$_____/Each
o.	3P-30A C/B	$_____/Each
p.	3P-40A C/B	$_____/Each
q.	3P-50A C/B	$_____/Each
r.	3P-75A C/B	$_____/Each
s.	3P-100A C/B	$_____/Each
t.	3P-125A C/B	$_____/Each
u.	3P-150A C/B	$_____/Each

5.	Furnish and install 3 Pole, 30A fuse cut-out with solid dedicated neutral.	$_____/Each
6.	Furnish and install 4" x 4" wire trough.	$_____/l.f.
7.	Same as above, but 6" x 6"	$_____/l.f.
8.	Furnish and install lighting fixtures complete with lamps as per specified by Architect.	
9.	Furnish and install edge lit exit light fixture.	$_____/Each
10.	Furnish and install single Pole, 20A, 277V/120V toggle switch complete with box, plate and 15 feet of 3/4" EMT with #12 AWG wires. (Stub-up)	$_____/Each
11.	Furnish and install 20A, 125V, single phase, 3 wire wall mounted duplex receptacle complete with box, plate and 15 feet of 3/4" EMT with #12 AWG wires.	$_____/Each
12.	Same as above, but double duplex.	$_____/Each
13.	Same as above, but 120/208V, 30A, Nema 14-30R.	$_____/Each
14.	Same as above, but wall mounted three phase, 208 volt, 30 Ampere.	$_____/Each
15.	Furnish, install and wire of a dual action EPO switch.	$_____/Each
16.	Furnish and install single gang back box for wall mounted telephone outlet and provide 3/4" EMT conduit stub-up with drag line at 3" above hung ceiling.	$_____/Each
17.	Same as above, but double gang back box and 1" EMT conduit stub-up.	$_____/Each
18.	Furnish and install wall mounted junction boxes complete with 15 feet of EMT and associated wires in it.	$_____/Each
19.	Same as above, but ceiling mounted.	$_____/Each
20.	Plugmolds, furnish, install & wire	$_____/Each
21.	Price of one "Control Point" for mechanical equipment including all necessary work.	$_____/1 Ctrl point
22.	Grounding every fourth pedestal of the raised floor.	$_____/Each

23. Furnish and install on raised floor pedestal of a grounding clamp include 6'-0' #6 AWG bare copper wire to existing grounding system $_____/Each

24. Furnish and install 1 #6 AWG bare copper wire for grounding system. $_____/l.f.

25. Furnish and install copper XHHW insulated wires or cable in new conduit including connections, splices, etc.

a.	#14 AWG	$_____/l.f.
b.	#12 AWG	$_____/l.f.
c.	#10 AWG	$_____/l.f.
d.	# 8 AWG	$_____/l.f.
e.	# 6 AWG	$_____/l.f.
f.	# 4 AWG	$_____/l.f.
g.	# 3 AWG	$_____/l.f.
h.	# 2 AWG	$_____/l.f.
i.	# 1 AWG	$_____/l.f.
j.	#1/0 AWG	$_____/l.f.
k.	#2/0 AWG	$_____/l.f.
l.	#3/0 AWG	$_____/l.f.
m.	#4/0 AWG	$_____/l.f.
n.	250 MCM	$_____/l.f.
o.	350 MCM	$_____/l.f.
p.	500 MCM	$_____/l.f.

26. Furnish and install EMT including bands, supports, etc. In hung ciling, below raised floor or in pipe shaft:

a.	3/4"	$_____/l.f.
b.	1"	$_____/l.f.
c.	1 1/4"	$_____/l.f.
d.	1 1/2"	$_____/l.f.

27. Furnish and install rigid aluminum conduit including couplings, lock-nuts, bushings, supports, etc., To run in hung ceiling, below raised floor or pipe shaft:

a.	2"	$_____/l.f.
b.	2 1 2"	$_____/l.f.
c.	3"	$_____/l.f.
d.	3 1 2"	$_____/l.f.
e.	4"	$_____/l.f.

28. Same as above, but to run exposed:

a.	2"	$_____/l.f.
b.	2 1 2"	$_____/l.f.
c.	3"	$_____/l.f.

d. 3 1/2" $_____/l.f.
e. 4" $_____/l.f.

29. Furnish and install strobe light and associated wiring (include 200 feet). $_____/each

30. Furnish and install smoke detection panel associated wiring.

31. Provide labor during a move-in weekend (Friday 5:00 P.M. Through Monday 10:00 A.M.) For a team consisting of a job super and two helpers. $_____Weekend

E-21 UPS SYSTEM

a. The System

1. This specification describes a continuous duty, solid state, Uninterruptible Power supply System, hereafter referred to as the UPS. The UPS shall operate in conjunction with the existing building electrical system to provide precise power for critical equipment loads. The system shall consist of a solid state inverter, rectifier/battery charger, storage batteries, a static bypass transfer switch, input harmonic filter, synchronizing circuitry and an external maintenance bypass switch as described in the following specification.

b. General Requirements

1. Applicable Documents

a. The UPS shall be designed in accordance with the applicable sections of the following documents:

Underwriters Laboratory (UL) Standard 1778
NEMA (NEMA PE-1)
IEEE Inverter Standards
ANSI C.62.41 (IEEE 587, Category B) Standards for Surge Withstandibility
ASME
National Electric Code (NFPA-70)
OSHA
FCC Rules and Regulations Part 15, Sub-Part J, Class "A"
Local Codes

b. All components shall be listed by Underwriter's Laboratories, Inc. (UL) if such listings have been established.

2. Materials

a. All materials and parts comprising the UPS shall be new, of current manufacturer, and shall not have been in prior service, except as required during factory testing.

3. Components

a. All active electronic devices shall be solid state and not exceed manufacturer recommended tolerances for maximum reliability. All semi-conductor devices shall be sealed. Vacuum tubes shall not be used. All relays shall be provided with dust covers.

c. System Description and Operation

1. System Definition

a. The UPS shall consist of a rectifier/battery charger, batteries, inverter, static bypass transfer switch, synchronizing equipment, protective devices, external maintenance bypass panel, harmonic filter, and accessories as specified herein that shall automatically effect continuity of electric power within specified tolerances, without interruption, upon failure or deterioration of the normal AC power source. Continuity of electric power to the load shall be maintained for an emergency period with the inverter supplied by the batteries, up to the specified maximum time or until restoration of the normal AC power source.

b. The UPS shall be fed from a single 480V - 3 Phase source consisting of one 3-pole circuit breaker.

2. Modes of Operation

a. The UPS shall be designed to operate as an on-line reverse transfer system in the following modes.

(1) Normal -- The critical loads shall be continuously supplied by the inverter. This inverter output shall be synchronized with the bypass AC power source. The rectifier/battery charger shall derive power from the utility AC source and supply DC power to the inverter while simultaneously float charging the battery.

(2) Emergency -- Upon failure of the utility AC power source, the critical load shall be supplied by the inverter, which without any switching, obtains its power from the storage battery. There shall be no interruption to the critical load upon failure or restoration of the utility AC source or upon connection of a standby generator source should one be provided at some point in the future.

(3) Recharge -- Upon restoration of the utility AC source (prior to complete discharge of the battery), the rectifier/battery charger powers the inverter and simultaneously recharges the battery. This shall be an automatic function and shall cause no interruption to the critical load.

(4) Bypass Mode -- If the UPS must be taken out of service for maintenance or repair of internal failures, the internal maintenance bypass transfer switch shall be used to bypass the inverter section without interruption. Automatic retransfer or forward transfer of the load shall be accomplished after the

UPS inverter synchronizes to the AC input source. Once the sources are synchronized, the static bypass transfer switch shall forward transfer the load from the bypass input source to the UPS inverter output by paralleling the two sources and allowing the inverter to ramp into the load and then disconnecting the bypass AC input source. Overlap shall be limited to one half cycle maximum.

(5) Maintenance Bypass - Provide a separate external maintenance bypass panel with three circuit breaker arrangement (input, output & tie). Provide Kirk key interlock to prevent inadvertant parallel of utility & UPS outputs.

d. UPS Requirements

1. System Rating

a. The UPS system shall be sized to maintain a continuous non-linear load of 75 KVA. The UPS system shall be equipped with batteries to supply a load of 75 KVA, at rated voltage, for a protection period of 15 minutes.

2. Electrical Characteristics

a. System Input Requirements

b. AC input to Rectifier/Battery Charger

Voltage:	120/208 volts AC, ±10%, 3 phase, 4 wires plus equipment ground.
Frequency:	60 Hz ±5%
Power Factor:	Typically 0.9 lagging with full load at nominal input voltage and normal float voltage on battery.
Circuit Harmonics:	3% THD Maximum at nominal conditions and at full load.

c. System Output Capacity

Rating:	75 KVA full load
Voltage:	120/208 volts AC, 3 phase, 4 wires, plus equipment ground, manually adjustable (±5%)
Frequency:	60 Hz nominal ±.5% Hz (when synchronized to the bypass AC input source).

d. Output Voltage Transient Characteristics for:

20% load step change ±1%
50% load step change ±4%
100% load step change ±5%

e. Output Voltage Transient Response -- The system output voltage shall return to within ±1% of the steady state value within 30 milliseconds.

f. Output Voltage Regulation -- The steady state output voltage shall not deviate by more than ±1.0% from no load to full load within 1.0 to 0.8 lagging power factor.

g. Output Frequency Regulation -- The UPS shall be capable of providing the nominal output frequency ±.1% when the UPS inverter is not synchronized (free running) to the AC bypass input line.

h. System Overload -- The inverter shall be capable of supplying regulated output during overloads of up to 125% of the system rating for a period of 15 minutes and 150% current for 1 minute. Overloads in excess and 170% of the UPS rating on an instantaneous basis or in excess of the overload time periods previously stated shall cause the static bypass transfer switch to reverse transfer and allow the AC bypass input to carry the load as required. After approximately five seconds, the static bypass transfer switch shall automatically forward transfer and normal UPS operation shall resume. If the overload still exists after the five second period, the static bypass transfer switch shall automatically reverse transfer the load to the AC bypass input source and the UPS inverter shall turn off. The system shall require manual restart after this sequence.

i. System Efficiency -- The manufacturer shall state the efficiency of the system in the proposal. Minimum system efficiency shall be 93%.

3. Rectifier/Battery Charger

a. General

(1) Incoming AC power shall be converted to a regulated DC output voltage by the rectifier/battery charger. The rectifier shall consist of an input EMI/transient suppressor network, a transformer, input filter, output filter and a 3 phase solid state rectifier which shall provide regulated DC voltage. DC voltage shall be subsequently filtered to provide power for the inverter and battery charging functions. The rectifier shall be full wave controlled type using SCR's on the positive and negative legs to eliminate even ordered harmonics. The rectifier/battery charger shall employ input AC current limiting as well as battery charger current limiting for battery protection. The battery charging circuitry shall be capable of being set for automatic battery recharge operation, float service, manual battery charge service and equalize or commissioning operation.

b. AC Input Protection

(1) The rectifier/battery charger shall be protected by means of an AC input circuit breaker. Overloads in excess of the rectifier/battery charger's normal rating or sensing of an abnormally high DC voltage condition shall cause the AC input circuit breaker to be tripped off.

c. Power Walk In

(1) The rectifier/battery charger shall contain a walk-in circuit that causes the unit to assume the load gradually after the input voltage is applied. Currents shall increase gradually from 20% to 100% over a 15 second period after the battery open circuit voltage has been reached.

d. Magnetization Inrush Current

(1) The initial magnetization inrush current shall be limited to 600% of the rectifier/battery charger full load current.

e. Input Power Factor

(1) The rectifier/battery charger shall have a minimum power factor 0.8 lagging at nominal input voltage and frequency and with the inverter operating at full rated load.

f. Overload Protection and Disconnect

(1) An automatic input circuit breaker shall be provided for rectifier/battery charger disconnection for overload and abnormally high DC voltage protection. The overload devices shall not be activated when the rectifier/battery charger is started under any of the operating conditions listed.

g. Capacity

(1) The rectifier/battery charger shall have sufficient capacity to support a fully loaded inverter and recharge the battery to 95% of its full capacity within 10 times the discharge period when input current limit is set at 125% of the normal full load rating.

h. Current Limiting

(1) Two separate and distinct current limiting schemes shall be employed in the rectifier/battery charger.

-- Input AC Current Limit--The AC input current limit shall be set up such that the total DC output current of the rectifier/battery charger is sufficient to operate the inverter at rated load and recharge a discharged battery to 95% of its original capacity in ten times the discharge period. Current demands in excess of this setting shall cause a corresponding decrease in the rectifier/battery charger output DC voltage.

-- Battery Charging Current Limit--The battery charge current limit shall be set up such as to limit the maximum recharge current as recommended by manufacturer. Current limiting shall be achieved by reducing the rectifier/battery charger DC output voltage when a set current limit point is attained.

i. Fuse Failure Protection

(1) Power semiconductors in the rectifier/charger shall be fused with fast-acting fuses, so that loss of any one power semiconductor shall not cause cascading failures. All fuses shall be provided with a blown fuse indicator with alarm indication on the control panel.

j. Output Filter

(1) The rectifier/charger unit shall have an output filter to minimize ripple current into the battery. Under no conditions shall ripple current into the battery exceed 2% RMS.

(2) The filter shall be adequate to insure that the DC output of the rectifier/charger will meet the input requirements of the inverter. The inverter shall be able to operate from the rectifier/charger with the battery disconnected.

k. Overvoltage Protection

(1) There shall be DC overvoltage protection so that if the DC voltage rises to the preset limit, the UPS is shut-down automatically and the load transferred to the static bypass line uninterrupted.

4. Inverter

a. Inverter shall consist of fast switching pulse-modulated (PWM) type inverter and output isolation transformer, an output filter, an output EMI/transient suppressor network and control circuit to provide precise AC voltage resolution and electronically controlled current limiting.

b. Frequency Control

(1) The output frequency of the inverter shall be controlled by an internal crystal oscillator, which shall be operated as a free running unit when not synchronized to the bypass AC input source. The inverter shall track the synchronizing source as long as the source is within a frequency range of $\pm$0.1 to 3 Hz, selectible in 0.1 Hz increments. If the external synchronizing source deviates from the preset frequency by the preset limits, the oscillator shall automatically revert to a free running mode of operation. An internal manual switch shall be provided to allow the unit to be operated continually on its internal oscillator with the static bypass transfer switch disabled or for normal operation whereby the UPS inverter synchronizes to the bypass AC input source and the static bypass transfer switch is enabled.

c. Frequency Regulation

(1) The inverter free running (non-synchronized mode of operation), steady state output frequency shall not deviate by more than $\pm$0.1% due to the following conditions:

-- 0% to 100% load.
-- Ambient temperature variation.
-- Minimum to maximum DC bus voltage.

(2) The inverter output shall have zero frequency transients for the system disturbances listed.

d. Harmonic Distortion

(1) The inverter shall provide harmonic filtering necessary to limit the total harmonic distortion (THD) in the output voltage to 4% and single harmonics to 3% over the entire linear load range. Additional output filtering shall not be required to reduce harmonics.

e. Transient Response

(1) The inverter transient voltage shall not exceed ±10/-8% due to the following system disturbances:

(a) A 100% step load application and removal with zero initial load or 100% initial load

(b) Transfer of rated load from the bypass source to the UPS inverter output during automatic forward transfer of the static bypass transfer switch.

(c) Loss of or return of main AC input.

f. Transient Recovery

(1) The output voltage shall return to within ±1% of the steady state value within 30 milliseconds.

g. Overload

(1) The inverter shall be capable of supplying currents and regulated voltage for overloads up to 125% of full load current for a period of up to 10 minutes and 150% current for 30 seconds. The static bypass transfer switch shall transfer the load to bypass if the overload exceeds the inverter's instantaneous rating of approximately 170% or the time periods previously stated.

h. Fault Clearing

(1) The inverter shall electronically be turned off to protect against excessive overload conditions which exceed the parameters defined. Simultaneous to turning the inverter off the static bypass transfer switch shall be used to transfer the load to the bypass AC input source which shall be used to provide the necessary fault clearing current required.

i. Inverter DC Protection

(1) The inverter shall be protected by the following features, that shall be independently adjustable for maximum system flexibility.

(a) DC Overvoltage Trip
(b) DC Undervoltage Warning

(c) DC Undervoltage Disconnect annunciated by an internal visual alarm and relay contact closure.

j. Output Protection

(1) The inverter shall be electronically turned off to protect against overloads and abnormal load conditions which exceed the units rating.

k. Overcurrent Protection

(1) The inverter shall be protected from excessive overloads, including faults and reverse currents, by fast acting fuses to prevent damage to power semiconductors. All fuses shall be provided with a blown fuse indicator with alarm indication on the control panel.

l. Surge Protection

(1) The inverter shall have built in protection against undervoltage, overcurrent, and overvoltage surges on the output caused by load transfer between the UPS and the bypass AC input source.

m. Overdischarge Protection

(1) To prevent battery damage from overdischarging, the UPS control logic shall automatically raise the shut-down voltage set point as discharge time increases beyond 10 minutes.

n. Inverter Output Voltage Adjustment

(1) The inverter shall use a manual control to adjust the output voltage from +, -5% of the nominal value.

e. System Status and Control

1. General

a. The UPS shall be provided with a microprocessor based unit status display and controls section designed for convenient and reliable operation interfacing. A system power flow diagram shall be provided as part of the monitoring and controls section which depicts a single-line diagram of the UPS. Electrically-illuminated visual indicators shall be of the long-life light-emitting diode (LED) type. All of the operator controls and monitors shall be located on the front of the UPS cabinet. The monitoring functions such as metering, status and alarms shall be displayed on an alpha-numeric digital display.

2. Metering

a. The following parameters shall be displayed:

Input AC voltage line-to-line and line-to-neutral for each phase.
Input AC current for each phase.

Rectifier output DC current.
Battery voltage.
Battery charge/discharge current.
Output AC voltage line-to-line and line-to-neutral for each phase.
Output AC current for each phase and neutral.
Percent of rated load being supplied by the UPS.
Battery time left during battery operation.

3. Alarms

a. The following alarms shall be displayed and an audible alarm shall be activated:

Input power failure
Battery discharging
Low battery
Overload
Overload shut-down
Load on bypass
Equipment overtemperature
Overtemperature shut-down
Fan failure
DC overvoltage
Control power failure
Output overvoltage
Output undervoltage
Fuse cleared
Rectifier/charger failure
Static transfer switch failure

b. The following additional alarms shall be displayed but shall not activate the audible alarm.

On maintenance bypass
On static bypass line
Sync with bypass line
Not in sync with bypass line
Out of frequency range
Rectifier/charger in current limit mode
Battery circuit breaker open

4. Controls

a. UPS start-up, shut-down, and maintenance bypass operations shall be accomplished by pushbutton switches. Pushbuttons shall be provided to display the status of the UPS. Pushbuttons shall also be provided to test and reset visual and audible alarms.

5. Mimic Panel

a. A mimic panel shall be provided to depict a single line diagram of the UPS. Indicating lights shall be integrated within the single line diagram to illustrate the status of the UPS power paths. The parameters to be displayed shall include, but not limited to the following:

Input power available
Output power available
Normal operation
Bypass operation

f. Static Transfer Switch

1. General

a. A static bypass transfer switch shall be provided as an integral part of the UPS. The control logic shall contain an automatic transfer circuit that senses the status of the inverter logic signals and alarm conditions to provide an uninterrupted transfer of the load to the bypass AC input source without exceeding the transient limits specified herein when a malfunction occurs in the UPS or when an external overload condition occurs. The static type switch shall be of the type which provides a make before break or overlap type transfer. Forward and reverse contactors shall be used in the UPS output and in parallel with the static switch for isolation, to minimize system losses and improve user operating efficiency.

2. Operation

a. The static bypass transfer switch shall be used to connect the AC bypass input source or the UPS inverter output to the critical load when required and have the following features:

b. Uninterrupted Transfer -- The static bypass transfer switch shall automatically cause the AC bypass input source to assume the critical load without interruption after the logic senses one of the following conditions:

(1) Inverter overload exceeds unit's rating.
(2) Battery protection period expired.
(3) Inverter failure

c. Interrupted Transfer -- If the bypass AC input source is beyond the conditions stated below an interrupted transfer (not greater than 0.2 seconds) shall be made upon detection of a fault condition.

(1) Bypass voltage greater than $\pm$10% from the UPS rated output voltage.
(2) Bypass frequency greater than $\pm$0.5 Hz from the UPS rated output frequency.
(3) Phase differential of AC bypass voltage to UPS output voltage greater than $\pm$2 degrees.

d. Manual Transfer -- A manually initiated static transfer shall be made by depressing the inverter ON or OFF pushbuttons on the system status and control panel.

e. Overload Ratings -- The static bypass transfer switch shall have the following overload characteristics.

(1) 1000% of UPS output rating for 2 cycle
(2) 150% of UPS output rating for five minutes

f. Automatic Uninterrupted Forward Transfer--The static bypass transfer switch shall automatically forward transfer, without interruption, after (1) the equipment is turned "ON", or (2) after waiting approximately five seconds after an overload induced reverse transfer has occurred. If the overload still exists when the static bypass transfer switch forward transfers it shall again reverse transfer the load to the bypass AC input source and simultaneously turn off the UPS inverter. The UPS inverter shall have to be manually restarted after experiencing this condition. Automatic forward transfer shall occur only after the UPS output synchronizes with the bypass AC input source.

g. Mechanical Design

1. Enclosures

a. The UPS shall be housed in free standing, dead front enclosure. Doors and framework shall be of 14 gauge steel. All instruments, status indicators, and controls shall be mounted on either the front of the UPS module or internally.

2. Ventilation

a. Forced air cooling shall be provided to ensure that all components are operated within their environmental ratings. Power switching modules shall be cooled by redundant fans located over the power switching modules, directly above critical components, to ensure that the cooling air path is not obstructed. Internal air baffles shall carry heated air from large magnetic components to reduce the interior cabinet temperature. Redundant fans shall be located above the air baffles. Blower motors shall be equipped with sealed bearings. Fan failures or a thermal overload shall be annunciated by a contact closure.

h. Approved Manufacturers

1. The UPS system shall be Liebert Corporation Series 300, MGE Comet Series or as approved.

i. Storage Battery

1. Cell Description

a. Dual string battery arrangement shall be used as a stored energy source for the UPS inverter. The total ampere-hour rating of the batteries shall be sufficient to support the inverter for 30 minutes with the UPS operating at rated load, 0.8

power factor, with ambient temperature 68°F. The battery parameters shall be in accordance with the input voltage requirements of the inverter section. The battery cells shall be of the sealed recombinant electrolyte type, assembled in heat-resistant shock absorbing plastic containers. Under normal operation of charging and discharging the battery shall not vent any gases to the atmosphere. The battery shall be suitable for installation in a computer room environment in proximity of electronic circuitry.

b. The battery shall be of the "maintenance free" type, approved by the local authorities for installation without ventilation of the area containing the battery cabinet.

2. Battery Cabinet

a. The UPS battery shall be mounted in self-contained cabinets. The battery cells shall be mounted on slide rail trays to permit ease of inspection or replacement.

3. Battery Disconnect

a. The UPS shall be provided with a separate circuit breaker for battery string to disconnect the DC circuit between the battery and the inverter input. Circuit breakers shall provide a positive means of isolating battery string from the rest of the system and from the second battery string for maintenance or due to a fault in the battery string itself. Circuit breakers shall be equipped with a shunt trip and auxiliary switches. The shunt trip shall be used to open the breakers upon activation of the Emergency Power Off (EPO) or battery breaker trip pushbuttons located on the UPS system status and control panel. The auxiliary switches shall be used to provide circuit breaker position indication on the system status and control panel. The battery circuit breaker shall be provided in a NEMA-1 enclosures suitable for wall mounting adjacent to the batteries.

4. Battery System Warranty

a. The UPS manufacturer shall provide in writing as part of the submittal a full 3 year (from the date of system start-up) unconditional warranty on the battery system. The UPS manufacturer shall be fully and solely responsible for any and all costs associated with the replacement of non-functional batteries, including all parts, labor, travel materials, tools, etc., except where the battery system has not been maintained in a suitable environment. Should a total rate of failure within the unconditional warranty period exceed 15% of the total number of batteries, the UPS manufacturer shall replace all batteries at no cost to the Owner. No exceptions will be allowed.

j. Testing

1. The equipment shall be tested in accordance with the manufacturer's standard Factory Acceptance Test procedure.

a. A certified test report, showing that the equipment has passed the factory and site tests and has demonstrated the full output ratings and performance required by this Specification, shall be submitted to the Owner promptly after completion of the tests. A battery test shall be available to assure proper operation of the UPS with a battery.

b. The manufacturer shall notify the Owner/Engineer at least 3-weeks in advance of the Factory Acceptance Tests in order that the Owner may witness the tests.

2. The manufacturer's acceptance test shall include tests as follows:

a. Load test

(1) Load tests shall be conducted at the following load levels and power factors. Load bank(s) shall be provided. Instrument readings shall be taken and output voltage signal shall be monitored on an oscilloscope. Input and output voltage and frequency shall be nominal values during test.

--	25-percent Load	0.8 PF	5 Minutes
--	50-percent Load	0.8 PF	5 Minutes
--	75-percent Load	0.8 PF	5 Minutes
--	100-percent Load	1.0 PF	5 Minutes
--	100-percent Load	0.8 PF	8 Hours

(2) Measure the temperature rise of all critical components of the UPS during the 8-hour run. Test for compliance with harmonic limits and phase angles.

b. Overload test

(1) Overload tests shall be conducted as follows:

--	125-percent Load	0.0 PF	10 Minutes
--	150-percent Load	0.8 PF	30 Seconds

c. Transient Test

(1) Transient tests shall be conducted. All load steps listed are unity power factory and balanced unless otherwise stated.

-- 0-percent to 100-percent load in one step.
-- 0-percent to 50-percent load at 0-load.
-- 50-percent to 100-percent load.
-- 100-percent to 0-percent load in one step.
-- Loss of input power under full load.
-- Return of input power under full load.

d. Other Tests

(1) Reasonable assurance shall be demonstrated for compliance with acoustical noise limits, electro-magnetic interference limits, in-rush current limiting, efficiency and voltage and currents on power semi-conductors, and capacitors and temperature rise on components.

e. Installation test

(1) A complete functional test of the UPS shall be performed with a resistive load bank at the site, after installation of the UPS, to ascertain that the equipment has suffered no impairment in performance since factory tests were made, and that the installation is in accordance with the manufacturer's set requirements.

(2) Cost for load bank rental and for factory technicians to perform the testing shall be included in the proposal.

(3) With the UPS operating from the prime AC power source at full load, effect bypass and return to normal functions. Record all pertinent data to show compliance with specifications.

(4) Battery test at customer's site

(a) With fully charged battery and with rated UPS load, disconnect AC input power. Battery shall support unit for a minimum of 15-minutes at full load.

(b) Return input power for 16-times the battery discharge interval. Repeat the above cycle.

(c) During the battery test at customer's site, measure and record the intercell connector voltage of at least 15-cells located throughout the battery.

(d) Perform battery certification test per IEEE 450.

k. START-UP

1. Following completion of the UPS installation, final site acceptance tests shall be performed by the Contractor and witnessed by the manufacturer's representative and the Owner/Engineer.

2. Manufacturer shall provide factory-trained personnel for check-out and start-up (prior to testing) and witnessing of the final site acceptance tests by his representative at no additional cost.

3. Manufacturer shall include in the proposal the lead-time notification required to arrange for check-out and start-up and the number of man-days proposed for start-up.

l. Maintenance Tools and Spare Parts

1. A set of maintenance special tools required for the maintenance of the UPS including switchgear, controls and battery shall be provided in an appropriate metal box with lock and 2-keys. General purpose tools are not included. Two hundred percent spare fuses shall be furnished for the UPS.

2. Recommended summary of spare parts and spare parts costs shall be furnished.

3. Technician Training

4. The vendor shall state whether a technical training course is available at the factory for service/maintenance personnel and provide details including costs, time required, technical ability, prerequisites, etc.

5. Provide for two training sessions at Site for maintenance, operations and elementary troubleshooting. The Owner has the option of video taping one training session.

m. Instruction Manual

1. The Manufacturer shall submit to the Owner 5 copies of the bound instruction manual containing the following materials, as applicable to the equipment which he will furnish.

a. System configuration with single line diagrams. All protective devices shall be identified by location, frame size, trip rating and manufacturer with type number.

b. Functional relationship of various equipment and shall include weights, dimensions and heat dissipation of each unit.

c. Detailed specifications of equipment to be furnished, including all deviations from these specifications.

d. Size and weight of individual shipping units to be handled by contractor in the field.

e. Detailed layouts of all metering, alarm and mimic panels.

f. Possible breakdowns and repairs for the type of equipment.

g. List of nearest local suppliers for all equipment.

h. Manufacturer's literature describing the equipment, control diagrams and wiring diagrams.

i. Battery discharge and capacity calculations indicating battery discharge cycles and life expectancy effect based on number and length of time.

j. Description of sequence of operation, where applicable.

k. Complete "as-installed" color-coded wiring diagrams of all systems.

n. Shop Drawings

1. Immediately upon receipt of notification of acceptance of his proposal and prior to shipment of equipment or start of installation of system components, the Contractor shall submit the following for approval.

a. A complete detailed set of construction drawings for equipment and systems indicating dimensions, materials of construction and methods of assembly.

b. Capacity and performance data.

c. Manufacturer's scale drawings of equipment in plan and elevation showing clearances required around and above units. Indicate the arrangement and size of the approved equipment on erection drawings.

d. In letter form, manufacturer's name for accessories and incidentals not covered by shop drawings.

e. Electric wiring diagrams and automatic control diagrams and sequences of operation.

f. UL listing numbers.

g. Short circuit interrupting ratings.

h. Dielectric test data.

o. Manufacturer's Warranty

1. The Manufacturer shall warrant that the equipment which he has furnished is free from defects in material and workmanship; his obligations under this warranty shall be as follows:

   a. The equipment manufacturer or supplier shall provide and pay for all labor, parts, accessories, materials, freight and other services to repair or replace any equipment or part thereof which, in the course of installation, start-up, and testing is found to be defective.

   b. For a period of one year from data of acceptance by the Owner or fifteen months from data of shipment, the Manufacturer shall repair or replace at his factory any defective equipment or part thereof. Freight costs for return of defective parts, labor for parts replacement, etc., will be paid for by the installing Contractor.

2. The final acceptance will be made after the Manufacturer has adjusted his equipment, balanced the various systems, demonstrated that it fulfills the requirement of the Drawings and Specifications, and has furnished all the required Certificates of Inspection and approval.

p. Maintenance Contract (Alternate Cost)

1. Proposal shall include projected cost of a full maintenance contract to cover adjustment, repair or replacement of all parts and labor to accomplish same; to become effective immediately upon expiration of the warranty period.

2. Submit cost for manufacturers standard contracts for periods of maintenance:

   a. 1 year
   b. 3 years
   c. 5 years

3. Maintenance contract price shall be based upon the performance of schedule preventive maintenance during normal working hours. Emergency repairs shall be made during normal or overtime hours as needed.

4. Submit a list of parts to be kept at the site.

q. Remote Supervision (Alternate Cost)

1. Provide alternate cost for auxiliary contacts, wiring and modem for connection, through a dedicated telephone line, to the manufacturer's maintenance center for remote trouble shooting if available. Indicate what facilities are available, if any, as part of the proposal.

E-22 POWER DISTRIBUTION UNIT

a. Input: 3-phase, 3 wire plus ground, 480 Volts, 60 Hz.

b. Output: 3-phase, 4 wire plus ground, 120/208 volts, 60 Hz, 75 KVA rated.

c. Transformer:

1. Double-Shielded, all copper windings. Class H 220° insulation. Temperature rise with 50% Linear and 50% Non-Linear load shall not exceed 80°C rise by resistance. Transformer shall have a K-factor rating of not less than 13.

2. Wiring connection between transformer neutral and neutral of each distribution panel shall be rated for twice the capacity as the phase wiring.

d. Input Circuit Breaker: 3 Pole - 125 Amps, shunt trip type circuit breaker at 480V.

e. Distribution Panelboards: PDU unit shall have two integral 42 pole panelboards and one 125A subfeed CB for connection to separate wall mounted panelboard (CP-93). The panelboard shall be configured for 120/208V, 225A main lugs, 125A main circuit breaker. Branch circuit breakers shall be "bolt-on" type. Neutral bus bar shall be sized at 200% of phase bus rating. The Panelboards shall be equipped with branch circuit breakers as per the attached panel schedules.

f. Voltage Adjustments: -10% to +5% of nominal in 2-1/2% increments.

g. Noise Attenuation: -120 dB

h. Efficiency: 97% minimum

i. Ground: Single point reference on separately derived system.

j. Shielding: Electrostatic

k. Cooling System: Convection

l. Monitored Parameters: Input and output voltages (phase-to-phase and phase-to-neutral as appropriate; output phase, neutral and ground currents; output power; power factor; percent load; frequency.

m. Alarm Conditions: Output over and under voltages; output overload; neutral and ground over currents, transformer over temperature, frequency deviation, phase sequence error; phase loss; (5) five customer specified alarm conditions.

n. Emergency Power Off (EPO): Provide EPO button as part of the monitoring panel of each unit. Units shall be equipped with terminals for connecting to a remote EPO switch.

o. PDU shall be either Liebert Catalog No. PPA 75C or as approved equal from Square "D".

FIELD TESTING

STROBE CIRCUIT	INSULATION RESISTANCE (MΩ)						STRAY VOLTAGE		TOTAL RESISTANCE (Ω)
	red/black (MΩ)	red/ground (MΩ)	black/ground (MΩ)	red/shield (MΩ)	black/shield (MΩ)	shield/ground (MΩ)	red/black (VAC)	red/black (VDC)	

STROBE TEST RESULT REPORT

FIELD TESTING

SPEAKER CIRCUIT	INSULATION RESISTANCE (MΩ)			STRAY VOLTAGE		TOTAL RESISTANCE (Ω)
	red/black (MΩ)	red/ground (MΩ)	black/ground (MΩ)	red/black (VAC)	red/black (VDC)	

FIELD TESTING

CABLE #	INSULATION RESISTANCE (MΩ)						STRAY VOLTAGE		CAPACITANCE			TOTAL RESISTANCE (Ω)
	red/black (MΩ)	red/ground (MΩ)	black/ground (MΩ)	red/shield (MΩ)	black/shield (MΩ)	shield/ground (MΩ)	red/black (VAC)	red/black (VDC)	red/black (μF)	red/shield (μF)	black/shield (μF)	

ALOLOOP TEST RESULT REPORT

ALOLOOP.XLS

SECTION 17000
TELECOMMUNICATIONS CABLING GENERAL CONDITONS

TC-1. GENERAL

a. The general conditions for contracts of construction, referred to in the contract documents as the general conditions, together with the following articles of the telecommunications cabling specifications, which amend, modify and supplement various articles and provisions of the general conditions, are made part of the Contract and shall apply to all work under the Contract.

b. All articles or parts of articles of the general conditions not so amended, modified or supplemented by these telecommunications cabling specifications shall remain in full force and effect. Should any discrepancy become apparent between the general conditions and these telecommunications cabling specifications the Contractor shall notify Owner/Engineer, in writing, and the Owner/Engineer shall interpret and decide such matters in accordance with the provisions of the General Conditions.

c. The Contractor shall comply with all applicable governmental regulations and with all Federal, State, County, City, and other applicable codes and ordinances.

d. These specifications call out certain duties of the Contractor and his suppliers. They are not intended as a material list of items required by the Contract.

e. These divisions of the specifications cover the telecommunication cabling system for Fred Alger & Company at One World Trade Center, 93rd floor in New York, NY.

f. For the purposes of these specifications, the term "telecommunications cabling system" shall include all cables, connectors, termination hardware, supports, ladder racks, equipment racks, equipment cabinets and termination frames described herein and in the associated specifications sections.

g. Contractor should note that in addition to the usual coordination with other trades, it will be necessary to coordinate with other telecommunications equipment vendors and contractors who will be working in the space at the same time as this work is being executed.

h. It is the intent of these specifications to provide a complete workable telecommunications cabling system ready for the Owner's use. Any item not specifically shown on the drawings or called for in the specifications, but normally required to conform with the intent, are to be considered as part of the Contract.

i. Any given item of equipment or material shall be the product of one manufacturer throughout the facility. Multiple manufacturers of any one item shall not be permitted, unless specifically noted otherwise.

j. These specifications are equipment and performance specifications. Actual installation shall be as indicated on the Drawings. Any discrepancies found

between the Specification and the Drawing shall be immediately brought to the attention of the Owner/Engineer.

k. Contractor shall keep the premises neat and clean. Removal of all packing materials for vendor supplied equipment provided under this work.

TC-2. DEFINITIONS

a. Certain terms such as "contractor, shall, provide, install, complete, start up" are not used in some parts of these specifications. This does not indicate that the items shall be less than completely installed or that systems shall be less than complete.

b. Utilize the following abbreviations for discernment on the Drawings and within the Specifications:

1.	AFF	Above Finished Floor
2.	ANSI	American National Standards Institute
3.	ASTM	American Society of Testing Materials
4.	CR	Communications Equipment Room
5.	EIA/TIA	Electronic Industries Association/Telecommunications Industries Association
6.	FBO	Furnished by others
7.	FCC	Federal Communications Commission
8.	IEEE	Institute of Electrical and Electronics Engineers
9.	MM	Multimode
10.	NEC	National Electrical Code
11.	NFPA	National Fire Protection Association
12.	OSHA	Occupational Safety and Health Administration
13.	ScTP	Screened Twisted Pair
14.	SM	Single Mode
15.	STP	Shielded Twisted Pair
16.	UL	Underwriters' Laboratories, Inc.
17.	UON	Unless Otherwise Noted
18.	UTP	Unshielded Twisted Pair

c. Utilize the following definitions for discernment within the Specifications:

1. "PROVIDE" or "FURNISH" means to supply, purchase, transport, place, erect, connect, test and turn over to Owner, complete and ready for regular operation, the particular work referred to.

2. "SUPPLY" means to purchase, procure, acquire, and deliver complete with related accessories.

3. "INSTALL" means to move from property line, set in place, join, unite, fasten, link, attach, set up or otherwise connect together before testing and turning over to Owner of equipment supplied under another division. Installation to be complete and ready for regular operation, the particular work referred to.

4. "WIRING" or "CABLING" means the inclusion of all fittings, conductors, connectors, connections, terminations and termination hardware and all other items necessary and/or required in connection with such work.

5. "CONDUIT" or "CABLE TRAY" or "LADDER RACK" means the inclusion of all fittings, hangers, supports, sleeves, etc.

6. "AS DIRECTED" means as directed by the Owner or his representative.

7. "CONCEALED" means embedded in masonry or other construction, installed behind wall furring or within double partitions, or installed within hung ceilings or under raised floors.

8. "EXPOSED" means not installed underground or "CONCEALED" as defined above.

9. "APPROVED" means as accepted and authorized, in writing, by the Owner or Engineer.

10. "OWNER" means Fred Alger & company.

11. "RDT" or "ENGINEER" means Robert Derector Telecommunications.

12. "EQUIPMENT ROOMS" means Service Entrance Rooms, Telecommunications Closets, Computer Rooms, PBX Rooms, LAN Rooms, Machine Rooms, etc.

13. "TERMINATION HARDWARE" means jacks, plugs, connectors, couplers, patch panels and punch down blocks for both copper and optical fiber cables.

14. "CATEGORY 3" means cabling and components which comply with all the applicable mechanical and electrical specifications for Category 3 cabling and connecting hardware as defined in ANSI/EIA/TIA 568A "Commercial Building Telecommunications Cabling Standard", EIA/TIA TSB 36 "Additional Cable Specifications for UTP Cables", EIA/TIA TSB 40A "Additional Transmission Specifications for UTP Connecting Hardware" and EIA/TIA TSB 67 as applicable.

15. "CATEGORY 5" means cabling and components which comply with all the applicable mechanical and electrical specifications for Category 5 cabling and connecting hardware as defined in ANSI/EIA/TIA 568A "Commercial Building Telecommunications Cabling Standard", EIA/TIA TSB 36 "Additional Cable Specifications for UTP Cables", EIA/TIA TSB 40A "Additional Transmission Specifications for UTP Connecting Hardware" and EIA/TIA TSB 67 as applicable.

16. "LINK" means end-to-end cabling from the work area outlet to the initial termination hardware in the equipment room including all cabling, connectors and termination hardware.

17. "CHANNEL" means end-to-end cabling from the desk top equipment to the equipment port in the equipment room, including all cabling, cross connects, patches, connectors, termination hardware and patch cables.

18. "HIGH PAIR COUNT CABLE" means cabling which contains 5 or more individual pairs of conductors under a common outer jacket.

19. "HIGH FIBER COUNT CABLE" means cabling which contains more than 4 individual optical fibers under a common outer jacket.

TC-3. SCOPE OF WORK

a. The work covered by these specifications includes the construction described, including all labor necessary to perform and complete such construction, all materials and equipment incorporated or to be incorporated in such construction and all services, facilities, tools and equipment necessary or used to perform and complete such construction.

b. The scope of work includes, but is not limited to, the work described herein and in the following specifications sections, as applicable:

1. Section 17100 - "Cable Tray and Ladder Rack"

2. Section 17200 - "100 Ohm UTP Cabling Systems"

3. Section 17300 – "Multimode Optical Fiber Cabling System"

4. Section 17500 - "Equipment Racks, Frames, Cabinets and Wire Management"

5. Preparation and submission of product data sheets, shop drawings, testing reports,record drawings,and documentation. Termination, connectorization, labeling, testing and documentation of all cables and components provided under these specification sections.

6. Cross connects and patching as noted.

7. Fire-stopping of all rated wall and floor penetrations.

TC-4. MATERIALS SUPPLIED BY OTHERS & INSTALLED UNDER THIS WORK

a. NONE.

TC-5. RELATED WORK PROVIDED BY OTHERS

a. Conduits & sleeves.

b. Plywood backboards.

c. Cutting, patching and painting.

TC-6. SITE VISIT

a. Prior to bid submission, visit the site and examine the drawings of other trades to determine the existing design conditions that may affect the work. The Contractor shall be held responsible for any assumptions in regard thereto.

b. Verify all dimensions and distances in the field and document the cable lengths and materials to be furnished and installed. The provision and installation of non-specified miscellaneous hardware and consumable items (i.e., nuts, bolts, tie wraps, etc.), shall be the Contractor's responsibility.

c. Existing site conditions, other contract documents and the overall construction schedule must be carefully reviewed to determine all required interfacing and timing of the work.

d. Existing contract documents for all other trades shall be made available for review through the General Contractor.

TC-7. CONTRACTOR QUALIFICATIONS

a. A minimum of 7 years experience in the installation of telecommunications cabling systems of the type and size to be provided on this project.

b. Project manager and foreman shall each have a minimum of 5 years experience in the installation of telecommunications cabling systems of the type and size to be provided on this project.

TC-8. BIDDING

a. At the time of bid, in addition to complete bid and pricing information, provide the following:

1. Detailed description of any and all additions, deletions or exceptions taken to the bid documents. Include reasons why changes are being proposed.

2. Detailed break-out of all requested alternate pricing.

3. Furnish and install unit price for each individual media type and component provided under this work.

4. Manufacturer's original equipment cuts of each product proposed for use on the project.

b. Bid shall not be considered without a complete product data submittal. No substitutions shall be allowed subsequent to award of bid except at the sole discretion of the Owner or Engineer.

c. Resumes of the proposed project manager and foreman.

TC-9. QUALITY ASSURANCE

a. All materials furnished shall be new and unused and free from defects. All materials shall meet all applicable codes provided a standard has been established for the material in question.

b. All products and materials to be clean, free of manufacturers defects, and free of damage and corrosion.

TC-10. SUBMITTALS

a. Submit within ten (10) working days of notice to proceed the following items in accordance with the Contract Documents:

1. Product Data

a) Three (3) sets of original manufacturer's product data sheets for all material and equipment proposed for use on this project. Only specified or base bid manufacturers or suppliers shall appear in the product data submittal.

b) Where product data sheets contain information on multiple products or product configurations, the specific item being submitted for approval shall be clearly marked.

2. Shop Drawings

a) Provide shop drawings as noted herein and in each individual specifications section.

b) Submit two (2) sepia's and three (3) prints for each drawing submitted.

1) Point-to-point intra-building cabling diagrams for all media installed under this contract.

2) Floor plans showing the location and type of all telecommunications outlets, equipment rooms, cable routes, serving areas, etc.

3) Riser diagrams showing the types, quantities, routing and termination locations for all vertical and horizontal back-bone cables, including cable support types and locations.

4) Detailed plan views of equipment rooms showing: exact placement of racks, frames, cabinets and ladder racks in relationship to lighting fixtures, duct work, diffusers, sprinkler piping, electrical panels and outlets, all cable routes within the room, etc.

5) Scaled elevations of all racks, frames and cabinets showing the placement of all equipment and termination hardware provided under this work.

6) Mounting and support details for all ladder rack, cabinets, equipment racks and frames.

7) Single line diagrams showing types, quantities, routing, termination points and termination hardware types for all inter-cabinet and inter-rack cabling.

8) Details showing the placement of labels on all cables, cabinets, racks, frames, outlets and termination hardware.

c) Drawings must show evidence of coordination with other trades.

d) All shop drawings shall be contractors original drawings. Submission of Engineer's design drawings as shop drawings is not permitted, except as approved in writing, by the Owner/Engineer.

b. Individual submissions shall be provided for each specific material, system or equipment as identified herein. Submittals provided other than in this manner shall be returned without review.

c. All product data and drawings shall be submitted sufficiently in advance of field requirements to allow ample time for review and re-submittal as may be required. All submittals shall be complete and contain all required and detailed information.

d. Acceptance of any submitted data or shop drawing shall not relieve Contractor from responsibility for errors, omissions or inadequacies of any sort.

e. Each product data submittal and shop drawing shall contain the contractors name, project number, project title and specific reference to the applicable drawing and specification section.

TC-11. DELIVERY, STORAGE AND HANDLING

a. Delivery of Materials: Deliver materials (except bulk materials) in manufacturer's unopened container, fully identified with manufacturer's name, trade name, type, class, grade, size and color.

b. Storage of Materials, Equipment and Fixtures: Store materials suitably sheltered from the elements, but readily accessible for inspection until installed. Store all items subject to moisture damage in dry, heated spaces. Provide space requirements for storage in submittals list. Storage space shall be assigned by the General Contractor. Maintenance and security of storage space is the responsibility of the Contractor.

c. Store all materials in a secure fashion to prevent the loss of these materials due to pilferage or theft.

TC-12. COORDINATION OF THE WORK

a. Certain materials to be installed under this Contract may be supplied by the Owner. Examine the contract documents to ascertain these items.

b. Carefully check space requirements and the physical confines of the area of work to insure that all material can be installed in the spaces allotted thereto, including equipment racks, and cable supports.

c. Transmit to other trades in a timely manner all information required for work to be provided under their respective sections in ample time for installation.

d. Wherever work interconnects with or contacts the work of other trades, coordinate with other trades to insure that all trades have the information necessary so that they may properly install all the necessary connections and equipment. Identify all items of work that require access so that the floor tile trade shall know where to install tile cutouts.

e. Due to the type of installation, a fixed sequence of operation is required to properly install the complete systems. Coordinate project and schedule work with the General Contractor in accordance with the construction sequence. Provide progress status of the installation to the General Contractor to allow them to update their project schedules.

f. Attend all construction meetings as requested by the Owner/Engineer or General Contractor.

g. When directed by the Owner/Engineer the Contractor shall, without extra charge, make reasonable modifications in the layout as needed to prevent conflict with work of other trades or for proper compliance with the design intent.

TC-13. CODES, REGULATIONS AND STANDARDS

a. The installation shall be in compliance with the requirements of the National Electrical Code, OSHA, recommendations and the rules, regulations and requirements of Federal Communications Commission.

b. The installation shall comply fully with all county, city, and state laws and ordinances, regulations and codes applicable to the installation.

c. Local electrical and building codes may differ with national codes. Follow the most stringent code or recommendations. Where there are instances of ambiguity, refer to the Owner/Engineer for interpretation.

d. All equipment shall be equal to or exceed the minimum requirements of NEMA, TIA/EIA, ISO, IEEE, ASME, ANSI and Underwriters' Laboratories.

e. Should any change in plans or specifications be required to comply with governmental regulations: notify the Owner/Engineer at the time of submitting construction schedule.

TC-14. SPECIAL CONDITIONS

a. The requirements and recommendations of all standards, specifications and codes referred to herein, including the telecommunications drawings, shall be considered a part of these specifications.

b. Except as modified herein, the requirements and recommendations of the latest editions of the following documents are made part of these specifications:

1. Division 16 Electrical specifications.

2. EIA/TIA - 568A *"Commercial Building Telecommunications Cabling Standard".*

3. EIA/TIA - 569 *"Commercial Building Standard for Telecommunications Pathways and Spaces".*

4. EIA/TIA - 606 *"Administration Standard for the Telecommunications Infrastructure of Commercial Buildings".*

5. EIA/TIA TSB-36 *"Additional Cable Specifications for UTP Cables".*

6. EIA/TIA TSB - 40A *"Additional Transmission Specifications for UTP Connecting Hardware".*

7. EIA/TIA TSB - 67 *"Transmission Performance Specifications for Field Testing of Unshielded Twisted Pair Cabling Systems"*

8. EIA/TIA - 607 *"Commercial Building Grounding and Bonding Requirements for Telecommunications".*

9. EIA/TIA - 526-14A, Method B: *"Optical Power Loss Measurements of Installed Multimode Optical Cable Plant."*

10. EIA/TIA - 526-7, Method A.1: *"Optical Power Loss Measurements of Installed Single Mode Optical Cable Plant."*

c. All local fees and permits and services of inspection authorities shall be obtained and paid for by the Contractor. The Contractor shall cooperate fully with local utility companies with respect to their services. Contractor shall include in his price all costs to be incurred relative to the furnishing and installation of the system described herein.

d. Certain components will be supplied by the Owner.

TC-15. WARRANTY

a. Provide a Warranty as noted herein and in accordance with the contract documents

b. All work and all items of equipment and materials shall be warranted for a minimum period of one year from the date of acceptance of the work. Where manufacturer's warranty are longer than one year, provide the extended guarantee. Upon notification of any defective items, repair or replace such items within 24 hours without cost to the Owner, all to the satisfaction of the Owner/Engineer.

TC-16. MATERIALS

a. Where specific items are called out in the specification or indicated on the drawings for a specific application, use those products or materials. Otherwise use first class products and materials.

TC-17. COMPONENT SPECIFICATIONS

a. Base bid manufacturers: Subject to compliance with technical requirements of these specifications, the contractor may provide cable and equipment, as noted, from the manufacturers listed in the appropriate specifications sections.

b. Substitution of products from manufacturers other than those listed in the base bid manufacturers lists must be noted at the time of bid.

c. The part numbers provided in the components sections have been coordinated with the latest manufacturers product literature and are accurate at the time of writing. They are, however, subject to change by the manufacturers at any time. If a specific number is invalid or conflicts with component description, request clarification from the Owner/Engineer prior to ordering components.

d. Provide components as indicated in each specifications section.

TC-18. INSTALLATION

a. Follow manufacturers' instructions for installing, connecting, and adjusting all equipment and cabling.

b. Submit three (3) copies of such instructions to Owner/Engineer before installing any equipment. Provide a copy of such instructions at the equipment during any work on the equipment. Where no instructions are included with the equipment, follow accepted industry practices.

c. Examine and compare the telecommunications cabling drawings and Specifications with the drawings and specifications of other trades; report any discrepancies between them to the Owner/Engineer and obtain written instructions for changes necessary in the work.

d. Install and coordinate the telecommunications cabling work in cooperation with other trades installing interrelated work. Before installation, make proper provisions to avoid interference's with other work in a manner accepted by the Owner/Engineer. All repairs or changes required in the work, caused by neglect, shall be made at no additional cost to the contract.

e. The locations of outlets, cabinets, frames, equipment racks, ladder racks and other equipment indicated on the drawings are approximately correct and are understood to be subject to such revision as may be found necessary or desirable at the time the work is installed.

f. Exercise particular caution with reference to the location of equipment racks, cabinets, frame, ladder racks, termination hardware, etc. and have precise and definite locations accepted by the Owner/Engineer before proceeding with the installation.

g. Telecommunication cables running parallel to electrical cables/conduits shall be separated by a minimum of 12".

h. Telecommunication cables which must cross electrical cables/conduits shall do so only at 90 degree angles and with a minimum vertical separation of 12".

i. The Contractor shall maintain current copy of the design drawings, specifications, equipment submittals and shop drawings at the job site at all times. These documents shall be made available to the Owner/Engineer at their request.

j. Keep all items protected before and after installation, with dust and moisture proof barrier materials. It shall be the contractor's responsibility to ensure the integrity of these protective measures for the project duration.

k. Ensure that safe ingress and egress from all work sites is maintained during movement and installation of materials.

l. Clean up all debris generated by installation activities. Keep all work areas free of debris at all times.

m. Perform all tests required by local authorities in addition to tests specified herein.

n. Deliver to Owner two sets of all special tools specifically needed for proper termination, operation, adjustment and maintenance of cable and cable termination hardware installed under this Contract.

o. At all times during the construction, protect all equipment from damage and theft. Equipment in the equipment room shall not be installed until such time as other trades have completed their work in that area so that the equipment shall not be moved or damaged.

p. Upon project completion, provide as-built drawings and documentation as defined herein and in related specifications sections.

TC-19. STAFFING

a. Keep a qualified foreman in charge of the work at all times. The foreman shall be present in the field at all times during the performance of the work. Such foreman shall be replaced if deemed to be unsatisfactory by the Owner/Engineer.

b. Designate in writing to the Owner/Engineer that the full time foreman shall serve as the prime contact for resolution of problems, job coordination, additions, changes, etc. The foreman shall have full authority to represent the Contractor in making decisions and executing the work in an acceptable manner.

c. Provide a supervisory work force sufficient to efficiently execute the work.

d. Throughout the project, provide levels of manpower necessary to meet all construction schedules.

e. Use only skilled, experienced and reliable workers and discontinue the services of anyone employed on this project upon written request of the Owner/Engineer.

f. Craft personnel shall be qualified to perform the work activities and be knowledgeable of the following:

1. Color coding of standard American telephone cables.

2. Installation and bonding of ground conductors and bonding and grounding of cables, racks and frames.

3. Testing copper conductors for opens, shorts and crossed pairs.

4. Termination and connectorization of UTP and optical fiber cables on all of the specified termination hardware.

5. Performance testing of EIA/TIA 568A and EIA/TIA TSB-67 Category 3 and Category 5 links and channels as defined herein.

6. Performance testing of multimode and single mode optical fiber cabling.

g. Telecommunications industry cable installation standards and manufacturer's instructions shall be used for in-process quality control and final acceptance of the work installation.

h. Termination hardware installation and termination practices contained in EIA/TIA-568A, EIA/TIA TSB - 36, EIA/TIA TSB - 40A and TSB-67 shall be followed.

i. Provide and use the proper tools and test equipment in the performance of each activity. Tools must be in good working order and test equipment must be properly calibrated. Contractor is responsible for safe storage of tools and is responsible for their security.

TC-20. INSTALLATION PRACTICES

a. Unless otherwise noted, all cables shall be installed between termination points as uninterrupted conductor sections in accordance with these Specifications, the manufacturers recommendations, and the accompanying Drawings. There shall be no splices or mechanical couplers installed between the cable points of origin and destination.

b. Minimum bend radius for cables:

1. Category 5 and Category 3 UTP cables, patch cords and cross connect wire: 6 times the cable diameter.

2. High pair count UTP cables: 10 times the cable diameter.

3. Optical fiber cables: 10 times the cable diameter.

4. Coaxial cables: 6 times cable diameter

c. Maximum pulling tension for cables:

1. Category 5 and Category 3 UTP cables: 25 lbs.

2. High pair count UTP cables: 200 lbs.

3. Two (2) and four (4) strand optical fiber cables: 25 lbs.

4. High fiber count cables: 200 lbs.

5. Coaxial cables: 25 lbs.

d. Cables shall not be kinked, crushed or otherwise deformed during or after installation.

e. Cables shall be protected from damage by other trades during and after installation.

f. Cables shall be protected from damage by foot traffic during installation. The Owner/Engineer reserves the right to direct the contractor to replace, at no additional cost, any and all cables that have in the opinion of the Owner/Engineer suffered mechanical damage during installation. Submit cable protection plan to Owner/Engineer for approval prior to cable installation.

g. Unless otherwise noted, cables, patch cords and cross connect wires in conduits, cable trays, ladder racks and wire management hardware shall be run loose and not bundled or tie wrapped together in any way. Cables bundled together for installation purposes shall be separated subsequent to installation.

h. Where cable are bundled inside equipment racks and frames for wire management purposes or for strain relief, utilize re-enterable Velcro ties.

i. Maintain each individual cable's sheath up to the points of termination by removing only as much cable sheath as is necessary and practical to terminate the cables.

   1. For Category 5 cables, a maximum of 1" of cable sheath shall be removed to accomplish cable termination.

j. Maintain pair integrity of individual cable pairs by untwisting pairs only as much as is necessary and practical to terminate the cables. Original cable pair twists shall be maintained to within 1/2" of the pair termination point.

TC-21. CABLING, CONNECTOR AND EQUIPMENT INSTALLATION

a. Furnish and install cabling, connectors and equipment in accordance with the requirements of the individual specifications sections.

TC-22. INSTALLATION OF OWNER FURNISHED EQUIPMENT

1. NONE

TC-23. EQUIPMENT AND CABLE GROUNDING

a. Provide equipment and cable grounding as described herein and in the individual specifications sections.

b. All equipment racks, cabinets, frames and ladder racks installed under this work shall be bonded to the nearest solid copper ground bar utilizing an insulated, stranded, uninterrupted No. 6 AWG grounding conductor. Where no ground bar exists: bond to nearest building column.

c. All cable shields shall be grounded to the rack/frame/cabinet within which the cable terminates in accordance with the manufacturers requirements and in compliance with all applicable local and national code requirements.

d. All grounding conductors shall be mechanically bonded to racks/frames/cabinets and to the grounding busbar with two whole grounding lugs which have been hydraulically crimped onto the conductor.

TC-24. IDENTIFICATION AND LABELING

a. Provide pre-printed name plates, labels or other identification media, at locations noted herein or as indicated on the drawings, for all cables, racks, cabinets, frames, termination hardware, outlets, boxes, etc. provided or installed under this work.

b. Where specific locations of labels or nameplates are not shown on the drawings, obtain locations from Owner/Engineer.

c. Coordinate all labeling and nameplate requirements with the Owner/Engineer and submit printed name plate and label samples to Owner/Engineer for approval prior to installation.

d. Cable and/or component ID's on all labels and nameplates shall be machine printed. Hand lettered labels or nameplates are only acceptable for use as temporary labeling during construction and will not be accepted for final installation.

e. If at any time during the project a label or nameplate becomes illegible, or is removed, the Contractor shall immediately replace it with a duplicate preprinted label or nameplate.

f. All labels and nameplates shall be placed so as to be both physically and visually accessible at all times.

g. Labels and designation strips for all cables, cable termination hardware and patch panels shall be color coded for easy identification.

h. Label and designation strip color coding shall be as follows.

1. Horizontal cables and cable termination hardware: Blue (Pantone 291C)

2. Backbone cables and cable termination hardware: White

3. Equipment cables and cable termination hardware: Purple (Pantone 264C)

4. Face plates, outlets and outlet boxes: White

i. Cable labels

1. Permanent, adhesive-backed cable labels shall be provided for all cables furnished and installed under this work.

2. Labels shall be of the types and sizes necessary to accommodate the size and physical characteristics of each cable type.

3. Labels shall be placed on both ends of the cable and no more than 6" from the point at which the cable is broken out into individual conductors.

4. Label shall be printed with black uppercase lettering on a permanent adhesive label stock. Labels shall be covered with a permanent water resistant sealer.

5. Labels shall be printed with the cable ID of attached cable.

j. Nameplates

1. Nameplates shall be provided for all racks, cabinets, frames, patch panels and cable termination fields provided or installed under this work.

2. Nameplates shall be sized as required to contain the required information.

3. Utilize a lamacoid or aluminum plate with beveled edges and a black enamel background. Lettering to be etched or engraved upper case white letters 1-1/4" high.

4. Nameplates shall be bolted onto racks and cabinets with countersunk bolts or screwed onto plywood backboards with countersunk wood screws.

k. Designation strips

1. Designation strips shall be provided for all termination hardware and optical fiber patch panels.

2. Designation strips shall be printed as follows:

a) For horizontal cable termination's: cable and outlet box/patch panel ID's for each cable.

b) For backbone cables: cable ID and pair/fiber count for each cable.

c) For equipment cables: cable and equipment cabinet ID for each cable.

3. Provide clear plastic holder over designation strips subsequent to installation.

l. Adhesive backed labels.

1. Permanent, adhesive backed labels shall be provided for outlet boxes, face plates and patch panels.

2. Labels shall be printed with black uppercase lettering on a permanent adhesive label stock. Labels shall be covered with a permanent water resistant sealer.

3. Labels shall be printed as follows.

a) For outlet boxes and face plates: single label with outlet ID and individual label for each connector showing cable ID.

b) For patch panels: single label with the patch panel ID and individual labels for each port showing cable ID.

m. See drawings for label placement on boxes, face plates and patch panels.

TC-25. INSPECTIONS AND TESTING

a. After the installation is complete test, as described herein and in accordance with the individual specification sections, all cables and components installed under this work.

b. Provide sufficient skilled labor and quantities of each type of test set or test tool to complete testing within the agreed upon test period. All test sets or tools of a given type shall be from the same manufacturer.

c. In addition to the required tests as described herein, and at such times as the Owner/Engineer directs, the Contractor shall be present while the Owner/Engineer conducts operating tests for approval. The installation shall be demonstrated to be in accordance with the requirements of this specification. Any defects revealed shall be corrected promptly at the Contractor's expense and the tests performed again.

d. The Owner/Engineer reserves the right to observe the conduct of any or all portions of the testing process. Notify the Owner/Engineer 1 week in advance of any testing.

e. The Owner/Engineer further reserve the right to conduct, using contractor equipment and labor, a random re-test of up to five (5) percent of the cable plant to confirm documented test results. Such re-tests may be observed and reported on by a third party contractor retained by the Owner/Engineer.

f. Unless otherwise noted, all tests shall be channel performance test and shall be conducted end-to-end, through all cross connects, patches and mounting cords. link performance tests shall not be acceptable, except where noted.

g. The Owner/Engineer reserve the right to require a re-test, at no additional cost to the Owner, of all cables not tested in accordance with the test procedures outlined below and in the individual specification sections.

h. Pre-installation testing.

   1. Visual inspect all cables, cable reels, and shipping cartons to detect cable damage incurred during shipping and transport. Return visibly damaged items to the manufacturer.

   2. Where post-manufacture test data has been provided by the manufacturer on the reel or shipping carton: submit copies to the Owner/Engineer for review prior to installing cables.

i. Post installation testing.

   1. Provide post installation testing of all cables in accordance with the individual specification sections.

j. All test data, including documentation of failed tests, the corrective procedures performed and the results of re-tests, are to be documented and submitted to the Owner/Engineer in machine readable format within five (5) working days of test completion. Hard copy or hand written test reports are not acceptable.

1. Provided all test data in either Microsoft Excel 7.0 (*.XLS files) or Microsoft Access 7.0 (*.MDB files) format.

k. Prior to testing, submit for review and approval by the Owner/Engineer copies of test report forms and data formats proposed for use.

l. As a minimum, each printed test report shall contain the following general information:

1. Project name, contractors name, type of test data included, date of test, date of report preparation, make, model and serial number of test equipment used, date of last calibration and names of test crew.

m. Printed test reports for each type of media or test shall be provided as indicated in the individual specification sections.

n. Test equipment:

1. Category 3 four (4) pair UTP cable: The Siemon Company Multi-test MT-5000 or approved equal

2. Category 5 four (4) pair UTP cable: Microtest Penta Scanner 350, Wavetek LANTek XL Pro, or approved equal.

3. High pair count cables: The Siemon Company Multi-test MT-5000 with adaptor, or approved equal.

4. For multimode optical fiber cable: Siecor OTS-110 with OS-100D light source, or approved equal.

5. For single mode optical fiber cable: Siecor OTS-110 with OS-210XD light source, or approved equal.

TC-26. ACCEPTANCE

a. Once the testing has been completed and the Owner/Engineer is satisfied that all work is in accordance with the Contract Documents, the Owner/Engineer shall notify the Contractor in writing of formal acceptance of the system.

TC-27. FIRE STOPPING

a. Subsequent to cable installation, provide fire stopping at all vertical and horizontal wall or floor penetrations. All fire stop materials shall be installed in full conformance with the manufacturers printed installation instructions.

b. For conduits and riser openings: provide non-hardening fire stop putty, including any necessary damming or installation materials.

c. For cable tray and other wall penetrations: provide removable intumescent fire stop bags. Provide wire mesh retainers over installed bags as recommended by manufacturer.

TC-28. RECORD DRAWINGS

a. During construction keep an accurate record of all deviations between the work as shown on the drawings and that which is actually installed.

b. Upon acceptance of the work by the Owner/Engineer, provide As-Built drawings of the complete installation including, but not limited to, the following:

1. Scaled (1/8' = 1'-0") floor plans showing main cable routes and the exact location and type of each telecommunications outlet.

2. Scaled (1/2" = 1'-0") part plans of all equipment rooms showing the exact placement of all cabinets, equipment racks, frames, ladder racks, termination hardware, etc. and all cable routes under the access floor or in overhead ladder/rack and cable tray.

3. Scaled (1/2" =1'-0") elevations of all racks/cabinets/frames containing termination hardware or other equipment provided or installed under this work showing the placement of each component, including all wire management hardware.

4. Riser diagrams of all backbone cabling indicating the type and quantity of each cable, all to-from information and the termination type for each end of each cable.

5. Single line diagrams showing all inter-rack and inter-cabinet cabling. Diagrams shall include cable types and quantities, to-from information and termination type for each end of each cable.

c. As-built drawings shall be provided in both reproducible hard-copy (reverse reading mylar) and machine readable (Autocad Release 13 for DOS) format.

d. Provide as-built cable termination and cross connect information for all cables, cross connects, patch cords and jumpers installed under this work.

e. As-built cable termination and cross connect information shall be provided in Microsoft Access version 7.0 data base (*.MDB) format.

1. Database files shall be organized by floor and by cable type. Coordinate format and organization with Owner/Engineer and obtain approval, in writing, of format prior to submission of as-built information.

f. Provide the Owner/Engineer with two (2) sets of Operation and Maintenance Manuals including:

1. Reduced-size (11" x 17") prints of all as-built drawings as described above.

2. Copies of all product data submittals and shop drawings.

3. As-built cable termination and cross connect schedules in both hard copy and machine readable (Microsoft Access 7.0) format.

4. Manufacturers original cut sheets for each cable type and component provided under this work.

g. Manuals shall be provided in a high quality, 3-ring binder and completely indexed. Submit manuals to the Owner not more than one month after project completion.

END OF SECTION

Section 17100
Cable Tray and Ladder Rack

TC-1. GENERAL

a. The requirements of Section 17000, *"Telecommunications General Conditions"*, are made part of these specifications and shall apply to all work executed under this Contract.

TC-2. SCOPE OF WORK

a. Provide a complete and workable cable tray and ladder rack system, as described herein and on the drawings, including:

1. Overhead ladder rack in all equipment rooms.

2. Wall penetrations, including framing, cutting and patching.

3. Supports, connectors, adapters, fittings, retaining posts, etc. necessary for a complete pathways installation.

4. Grounding of all pathways provided under this work.

b. All work performed under this section shall conform to the following specification sections:

1. Section 17000 - Telecommunications General Conditions.

TC-3. MATERIALS SUPPLIED BY OTHERS & INSTALLED UNDER THIS WORK

a. None.

TC-4. RELATED WORK PROVIDED BY OTHERS

a. Telecommunications cabling.

b. Cutting, patching and painting.

TC-5. COMPONENT SPECIFICATIONS

a. Base bid manufacturers: Subject to compliance with technical requirements of these specifications, the contractor may provide equipment, as noted, from the manufacturers listed below:

1. Ladder Rack

a) Chatsworth Products, Inc.

b) B-Line Telecom

c) Newton Instruments

2. Cable Retaining Posts

   a) Newton Instrument Company.

   b) Chatsworth Products

   c) B-Line Telecom

3. Metal Framing Channel

   a) B-Line Systems

   b) Unistrut

   c) Kindorf

4. Threaded Rod

   a) Kindorf

   b) Unistrut

   c) Chatsworth Products

   d) Newton Instrument Company

5. Category 5 J-hooks

   a) Contractor option

b. The part numbers provided in this section have been coordinated with the latest manufacturers product literature, and are accurate at the time of writing. They are, however, subject to change by the manufacturers at any time. If a specific part number is invalid or conflicts with component description, request clarification from the Owner/Engineer prior to ordering components.

1. Ladder Rack

   a) Tubular steel bar type cable rack with 0.065" thick side walls. 1.50" H x 0.375" W stringers. 1.50" W x 0.375" H rungs set 12" on center. Widths as noted. Color: Black.

   b) Complete with all necessary supports, hangers, connectors, nuts, bolts, etc. necessary for a complete installation.

   c) Manufacturer: Chatsworth Product, Inc.

Part No.:	10250-715	(15" wide rack)
	16301-001	(butt splice kit)
	16302-001	(junction splice kit)
	10702-002	(spanner "J" bolt)

03001-001	(1/2-13 nut)
10642-001	(stringer end cap)
11700-015	(end closing kit)
12061-001	(grounding kit)

Or approved equal

2. Cable Retaining Posts

   a) Tubular steel cable retaining post. Zinc and gold chromate finish. 6" High. Complete with end cap and necessary mounting hardware.

   b) Manufacturer: Newton Instrument Company, Inc.
   Part No.: 2105-2 (6" post)
   A-3963 (end cap)

   Or approved equal

3. Metal Framing Channels

   a) Cold Rolled "U" shaped framing channel. 12 Ga. (2.6mm) low carbon steel construction. 2-7/16" high by 1-5/8" wide. 9/16" x 7/8" slots 2" O.C.

   b) Complete with all necessary hardware for complete installation.

   c) Manufacturer: B-Line Systems
   Part No.: B12SH

   Or approved equal

4. Support Rods

   a) 3/8-16 all threaded steel rods. Minimum tensile load capacity 1130 lbs.

   b) Manufacturer: Chatsworth Products, Inc.
   Part No.: 11440-003 (3/8-16 ATR)
   20142-091 (3/8-16 hex nut)

   Or approved equal

TC-6. INSTALLATION

a. Ladder Rack

1. Overhead ladder racks shall be provided in the equipment rooms as noted on the drawings.

2. Ladder racks shall be supported a minimum of every 5' on center and at the end of every cable ladder run, utilizing trapeze type supports, attached directly to the slab above. No cantilever ladder rack sections shall be permitted.

3. Provide end closing kits on all ladder rack ends.

4. Ladder racks shall be installed 7'-6" AFF to underside of ladder, unless otherwise noted.

5. Trapeze supports shall consist of a horizontal framing channel attached directly to the slab above with a minimum of two (2) 3/8-16 threaded rods.

6. Attach threaded rods to framing channel with two nuts, and saddle washer at lower nut, as indicated on the drawings.

7. Ladder racks shall be secured to each horizontal framing channel with two (2) spanner "J" bolts as indicated on the drawings.

8. Provide 6" high cable retaining posts, with end caps, on either side of all cable ladder sections in the CR. Retaining posts to be provided every 20" on center and at each cable ladder intersection.

9. Coordinate placement of cable ladders and supports with duct work, conduits, piping, lighting fixtures, etc.

10. Coordinate placement of supports with ceiling trades and transmit information regarding necessary ceiling penetrations to them in a timely manner. Ceiling cuts provided by others.

TC-7. WALL PENETRATIONS

a. Provide penetrations of equipment room walls as noted on the drawings.

b. Wall penetrations shall be internally framed with metal framing studs to facilitate fire stopping.

TC-8. FIRE STOPPING

a. Fire stop all rated wall penetrations in accordance with section 17000.

TC-9. GROUNDING

a. Cable trays and ladder racks shall be grounded as prescribed in Article 318 of the N.E.C., in accordance with all local code requirements and in accordance with the latest draft of EIA/TIA - 607 *"Grounding and Bonding Requirements for Commercial Building Telecommunications Systems"*.

b. Provide braided or stranded copper ground straps between each adjoining section of steel ladder rack. Provide braided aluminum ground straps between adjoining sections of aluminum cable trays. Mechanically bond ground straps to each section of ladder rack or cable tray.

c. Where ladder racks or cable trays are painted or anodized, remove paint down to bare metal before attaching ground straps.

d. Provide a continuous, stranded, insulated No. 6 AWG ground conductor between the cable trays and ladder racks and the telecommunications ground bar in the equipment rooms. See electrical drawings for location of ground bar.

e. Provide a continuous, stranded, insulated No. 6 AWG ground conductor between each conduit or cable tray entering the equipment rooms and the telecommunications ground bar in the equipment rooms.

TC-10. RECORD DRAWINGS

a. Provide as-built documentation in accordance with the requirements of section 17000 *"Telecommunications General Conditions."*

END OF SECTION

SECTION 17200
100 Ohm UTP CABLING SYSTEM

TC-1. GENERAL

a. Provide complete 100 Ohm Unshielded Twisted Pair (UTP) cabling system, with capacities as noted, in accordance with these specifications and section 17000.

TC-2. SCOPE OF WORK

a. The scope of work covered by this section of the specifications includes, but is not limited to, providing the following:

1. Four (4) pair Category 5 UTP cabling between individual outlet locations as indicated on the drawings and the horizontal cable termination hardware in the equipment rooms.

2. Category 5 UTP termination hardware, including face plates, at the work area outlets and in the equipment rooms.

3. Surface mounted boxes at the locations noted on the drawings.

4. Termination, labeling and testing of all cables provided under this contract.

TC-3. SUBMITTALS

a. Provide submittals in accordance with these specifications and with the requirements of section 17000.

TC-4. COMPONENT SPECIFICATION

a. Base bid manufacturers: Subject to compliance with technical requirements of these specifications, the contractor may provide cable and equipment, as noted, from the manufacturers listed below:

1. Four (4) Pair UTP Cable

   a) Mohawk

   b) Berk -Tek

   c) Lucent Technologies

   d) CommScope

2. Jumpers, Patch Cords and Mounting Cords

   a) The Siemon Company

   b) Panduit

5. Results of continuity, shorts and crossed pair testing, including a "wire map" of the complete link.

6. The length of each cable pair in feet.

7. The ambient noise value, in mV RMS, measured for each pair.

8. The worst case attenuation, normalized to 100 meters, for each cable pair in dB.

9. The worst case NEXT data in each direction, in dB, for all six possible pair combinations, including the frequency, in MHz, at which the worst case NEXT occurred.

10. The performance band into which the worst case pair combination falls in each direction.

11. The calculated Signal-to-Crosstalk ratio (SCR) for all six possible pair combinations.

12. Report shall also contain a listing, by cable and pair, of failed tests and corrective measures taken.

TC-13. FIRE STOPPING

b. Provide fire stopping in accordance with Section 17000.

TC-14. RECORD DRAWINGS

b. Provide record drawings in accordance with section 17000 of the specifications.

END OF SECTION

SECTION 17300
MULTIMODE OPTICAL FIBER CABLING SYSTEM

TC-1. GENERAL

a. Provide complete mm optical fiber cabling system, with capacities as noted, in accordance with these specifications and section 17000.

b. UON, the media covered under this specification section is 62.5/125 micron - multimode, graded index optical fiber cable conforming to the mechanical and optical requirements of EIA/TIA 568A for multimode optical fiber cable.

TC-2. SCOPE OF WORK

a. The scope of work covered by this section of the specifications includes, but is not limited to, providing the following:

1. High fiber count backbone cabling between rack mounted backbone cable termination hardware in the computer room and Hub closet.

2. Termination, labeling and testing of all cables provided under this contract.

TC-3. SUBMITTALS

a. Provide submittals in accordance with these specifications and with the requirements of section 17000.

TC-4. COMPONENT SPECIFICATION

a. Base bid manufacturers: Subject to compliance with economical requirements of these specifications, the contractor may provide cable and equipment, as noted, from the manufacturers listed below:

1. MM Optical Fiber Cable

   a) CommScope

   b) Mohawk

   c) Siecor

   d) AMP, Inc.

2. Jumpers, Patch Cords and Mounting Cords

   a) AMP, Inc.

   b) Siecor

   c) The Siemon Company

b) SC-to-SC

1) 62.5/125 multimode optical fiber patch cord. Single strand or two strand "zip cord" construction, as required, with NEC OFNR rated outer jacket. One (1) EIA/TIA 568A compliant SC-type connector each end of each fiber. Lengths as noted.

2) Minimum mechanical and optical characteristics: Equal to or better than individual characteristics established in EIA/TIA 568A for optical fiber cable.

3) Manufacturer: The Siemon Company.
Part No.: FJ2-SCSC-MM-01 (duplex 1m)
FJ2-SCSC-MM-03 (duplex 3m)

Or approved equal

3. Connectors

a) SC-type optical fiber connectors. Ceramic ferule. No polish/no epoxy mechanical termination. Maximum loss per mated pair: .3 dB.

b) Minimum mechanical and optical characteristics: Equal to or better than individual characteristics established in EIA/TIA 568A for optical fiber connectors.

c) Manufacturer: Siecor
Part No.: 95-000-41 (SC-type)

4. Patch Panels

a) Rack Mounted.

1) 19" Rack mounted optical fiber patch panel. Complete with integral strain relief, build-outs, couplers and panels to accept SC-type connectors.

2) Manufacture: The Siemon Company
Part No.: FCP-RACK (16 port patch panel)
FCP-BZL-1SC (bezel with duplex SC adapter)
FCP-BZL-1 (blank adapter plate)

Or approved equal

TC-5. INSTALLATION

a. Provide cable and connector installation as described herein and in accordance with section 17000 "Telecommunications General Conditions".

TC-6. OPTICAL FIBER CABLE INSTALLATION

a. Backbone optical fiber cabling

1. Provide high pair count backbone optical fiber cables, in the types and quantities as noted on the drawings.

2. Cables shall be run through 1" Plenum innerduct between the computer room and the Hub closet in the hung ceiling .

3. Terminate each end of each cable with optical fiber termination hardware as noted herein and on the drawings.

b. Inter-Rack Cabling and Jumpers

1. Provide inter-rack and inter-cabinet cabling and jumpers, in the types and quantities as noted on herein and on the drawings, in the equipment rooms.

2. Jumper shall be factory manufactured by the manufacturer noted above. Field assembled jumpers, or jumpers from manufacturers other than those listed, will not be accepted.

TC-7. OPTICAL FIBER TERMINATION HARDWARE AND CABLE TERMINATIONS

a. Provide optical fiber termination hardware in equipment rooms in types and quantities to sufficiently terminate all optical fiber cables in accordance with the requirements defined herein and on the drawings. Provide patch panels fully loaded with duplex SC adaptors.

b. Subsequent to cable installation terminate each end of each strand of all backbone cables with SC-type connectors.

c. For high fiber count backbone cables: after termination install cables in rack mounted optical fiber patch panels as noted on the drawings.

d. Cable termination's shall be in accordance with the termination hardware manufacturers printed instructions and the requirements of EIA/TIA 568A, as applicable.

TC-8. STRAIN RELIEF

a. Provide a single point of strain relief, utilizing Velcro-type re-enterable cable ties, for all cables at the point where they enter a rack, cabinet or patch for termination. Secure the cable tie to the rack, cabinet, patch panel or backboard as necessary to ensure adequate strain relief.

b. For high fiber count cables, provide equivalent strain relief for entire cable as well as for each individual group of fibers.

TC-9. CROSS CONNECTS AND PATCHING

a. Provide patch cords in each equipment room as noted below:

1. Two (2) duplex SC-to-ST patch cords 3 meters long.

b. The contractor shall verify with the Owner/Engineer, in writing, the types, lengths and quantities of patch cords needed prior to ordering any patch cords.

c. All cross connects and patches shall be done in accordance with cross connect schedules to be provided by the Owner. All unused patch cords shall be turned over to the Owner at the completion of the work.

TC-10. GROUNDING

a. Provide grounding in accordance with Section 17000.

TC-11. IDENTIFICATION AND LABELING

a. Provide identification and labeling in accordance with Section 17000.

TC-12. INSPECTIONS AND TESTING

a. Provide inspection and testing of the complete installation in accordance with these specifications and the requirements of section 17000.

b. Post installation testing:

1. Optical fiber link performance testing shall be conducted in accordance with the requirements of EIA/TIA-526-14, Method B *"Optical Power Loss Measurements of Installed Multimode Fiber Cable Plant"*.

2. Perform end-to-end power meter test of each fiber strand from outlet-to-patch panel and from patch panel-to-patch panel as required.

3. Equipment calibration and testing shall be conducted in accordance with the test equipment manufacturers printed test instructions. Submit copies of detailed test procedure to Owner/Engineer for approval prior to testing.

4. Perform reference set-up and jumper check prior to beginning each set of tests. Jumpers shall remain attached to power meter and light source subsequent to performing set-up and jumper check. If jumpers are removed from power meter or light source, re-calibrate prior to commencement of tests.

5. Jumpers used for testing shall be factory manufactured by the manufacturer of the test equipment. Field manufactured jumpers, or jumpers from source other than the test equipment manufacturer, shall not be permitted.

6. Jumpers shall be held as straight as possible during tests. Minimum bend radius for jumpers shall be 1". Utilize 2" O.D. mandrel, where necessary, to maintain jumper bend radius.

7. Tests shall be performed at both 850nm and 1330nm to measure total link loss at each wavelength.

8. For horizontal cables: demonstrate that actual link loss at each wavelength is less than 2 dB.

9. For backbone cables: demonstrate that actual link loss at each wavelength is within .5 dB of calculated loss for each link.

10. Where the measured attenuation of any link is greater than that specified, conduct all required additional testing, including Optical Time Domain Reflectometry (OTDR) to determine cause of performance differences.

11. If bad connector pair is found, replace both connectors.

12. Replace entire cable if defective fiber is found.

c. Provide test results in accordance with section 17000 and as described below.

d. Printed test reports for optical fiber link testing shall contain the following information for each optical fiber test run.

1. Cable number, cable type and fiber number.

2. Direction of test.

3. Measured signal attenuation in dB.

4. Calculated signal attenuation in dB.

5. A listing, by cable and strand, of failed tests and corrective measures taken.

TC-13. FIRE STOPPING

a. Provide fire stopping in accordance with Section 17000.

TC-14. RECORD DRAWINGS

a. Provide record drawings in accordance with section 17000.

END OF SECTION

Section 17500
Equipment Racks, Frames, Cabinets and Wire Management

TC-1. GENERAL

a. The requirements of Section 17000, *"Telecommunications General Conditions"*, are made part of these specifications and shall apply to all work executed under this Contract.

TC-2. SCOPE OF WORK

a. Provide a complete and workable equipment racks, frames, cabinets and wire management hardware as described herein and on the drawings, including:

1. 19" equipment racks.
2. File server racks.
3. XLBET frames.
4. Equipment Cabinets.
5. Wire management hardware.
6. Supports, connectors, adapters, fittings, mounting hardware, etc. necessary for a complete pathways installation.
7. Grounding of all equipment racks, frames and cabinets provided under this work (including the ground busbar).

b. All work performed under this section shall conform to the following specification sections:

1. Division16 - Electrical General Requirements.
2. Section 17000 - Telecommunications General Conditions.

TC-3. MATERIALS SUPPLIED BY OTHERS & INSTALLED UNDER THIS WORK

a. None.

TC-4. RELATED WORK SPECIFIED ELSEWHERE

a. Telecommunications cabling.

b. Identification and labeling.

TC-5. COMPONENT SPECIFICATIONS

a. Base bid manufacturers: Subject to compliance with technical requirements of these specifications, the contractor may provide equipment, as noted, from the manufacturers listed below:

1. 19" Equipment Racks

   a) Chatsworth Products, Inc.

   b) The Siemon Company, Inc.

2. Wire Management Hardware

   a) The Siemon Company

   b) Chatsworth Products

3. Grounding Busbar

   a) Chatsworth Products, Inc.

   b) Newton Instrument Co., Inc.

b. The part numbers provided in this section have been coordinated with the latest manufacturers product literature, and are accurate at the time of writing. They are, however, subject to change by the manufacturers at any time. If a specific part number is invalid or conflicts with component description, request clarification from the Owner/Engineer prior to ordering components.

1. 19" Equipment Rack

   a) EIA 310-C standard or compliant self supporting 19" equipment rack. 6061-T6 aluminum construction with two upper angles for additional strength. Rack drilled on both sides for equipment mounting. 84" high x 6" deep. Complete with all necessary mounting hardware. Color: Black

   b) See drawings for quantities

   c) Manufacturer: The Siemon Company
   Part No.: RS-07 (19" rack)
   RS-CNL (vertical cable management panel)

Or approved equal

2. Rack Mounted Shelves

   a) Heavy Duty Equipment shelf. Complete with mounting hardware.

b) See drawings for quantities.

c) Manufacturer: Chatsworth Products, Inc.
Part No. 1164-719

3. Ground Bar

a) 10" wide X 4" high pre-drilled solid copper ground. Seventeen (17) 9/32" diameter attachment holes. Complete with mounting brackets, ceramic stand-offs and installation hardware.

b) Manufacturer: Chatsworth Products, Inc.
Part No.: 10622-010

Or approved Equal

4. Wire Management Panels

a) 19" rack mountable wire management panels. Five (5) split "D" rings per panel. Panel 2RMS high.

b) Manufacturer: The Siemon Company
Part No.: WM-144-5

TC-6. INSTALLATION

a. All racks, cabinets and frames shall be assembled in accordance with the manufacturers printed instructions.

b. Coordinate placement of racks, cabinets and frames with ladder rack, duct work, conduits, piping, lighting fixtures, etc.

c. Provide equipment racks, cabinets and frames in equipment rooms in the quantities and locations as noted on the drawings.

d. Equipment racks and cabinets shall be bolted to the slab below with a minimum of four (4) ½" bolts.

e. Where racks/cabinets/frames are on raised floor: bolt to slab with a minimum of four (4) ½" treaded rods. Provide metal framing channel anchored to slab below raised floor, as necessary, to attach threaded rods.

f. Provide wire management panels in racks as cabinets in the quantities indicated on the drawings.

TC-7. GROUNDING

a. Cabinets, racks and frames shall be grounded as prescribed in Article 318 of the N.E.C., in accordance with all local code requirements and in accordance with the latest draft of EIA/TIA - 607 *"Grounding and Bonding Requirements for Commercial Building Telecommunications Systems".*

b. Provide a continuous, stranded, insulated No. 6 AWG ground conductor between racks, cabinets and frames and the telecommunications ground bar. See drawings for location of ground bar.

TC-8. RECORD DRAWINGS

a. Provide as-built documentation in accordance with the requirements of section 17000 *"Telecommunications General Conditions."*

END OF SECTION

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PROJECT MANUAL

FOR

GENERAL CONSTRUCTION

Fred Alger Management, Inc.

One World Trade Center - 93rd Floor

Project #28.8011.000

GENSLER

One Rockefeller Plaza - Suite 500

New York, New York 10020

OFFICE COPY

ISSUED FOR PRICING AND PORT AUTHORITY REVIEW

JUNE 15, 1998

THE PORT AUTHORITY OF N.Y. & N.J.
ENGINEERING DEPT. QUALITY ASSURANCE DIV.
DESIGN STANDARDS
JUN 29 1998
WC98-1175 (1)
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TENANT COI UNIT

Dwg's	SUB	CAD. TUBE
Spec's	✓	6A

PROJECT MANUAL
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GENERAL CONDITIONS

PART 1 - GENERAL

1.01 GENERAL CONDITIONS

A. The General Conditions of the Contract for Construction shall be Gensler's GCI "General Conditions of the Contract for Construction", 12/01/89, 14 Articles, 19 pages, which is made a part of the Contract Documents and attached to Section 00700 for the Contractor's reference.

B. The Contractor is hereby specifically directed, as a condition of the Contract, to acquaint himself with the Articles contained in the attached General Conditions, and to notify and apprise all subcontractors and any other parties to the Contract or individuals or agencies engaged on the work as to its contents.

C. No contractual adjustments shall be due or become expected as a result of failure on the part of the Contractor or subcontractors or both to fully acquaint themselves with the General Conditions.

D. The General Conditions of the Contract for Construction are amended by annotations and by reference to riders as scheduled in Article 1.02.

E. Where provisions of General Conditions relate to project administrative or work-related requirements of the Contract, those paragraphs are expanded in Division 1 - General Requirements of the specifications.

F. The provisions of the General Conditions of the Contract; and DIVISION 1 - General Requirements apply to the work specified in each section of the Technical Specifications.

1. Every item of work performed under a subcontract is subject to these conditions and requirements.

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Article 1
GENERAL PROVISIONS

1.1 BASIC DEFINITIONS

1.1.1 The Contract Documents: The Contract Documents consist of the Agreement between Owner and Contractor (hereinafter the Agreement), Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, *schedules,* addenda issued prior to execution of the Contract, other documents listed in the Agreement and Modifications issued after execution of the Contract. A Modification is (1) a written amendment to the Contract signed by both parties, (2) a Change Order, (3) a Construction Change Directive or (4) a written order for a minor change in the Work issued by the Architect. *When executed as part of the Agreement,, bond forms are part of the Contract Documents.* Unless specifically enumerated in the Agreement, the Contract Documents do not include other documents such as bidding requirements (advertisement or invitation to bid, Instructions to Bidders, sample forms, the Contractor's bid or portions of addenda relating to bidding requirements).

1.1.2 The Contract: The Contract Documents form the Contract for *Construction (hereinafter the Contract).* The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations or agreements, either written or oral. The Contract may be amended or modified only by a Modification. The Contract Documents shall not be construed to create a contractual relationship of any kind (1) between the Architect and Contractor or *any other person or entity* (2) between the Owner and a Subcontractor or Sub-subcontractor or (3) between any persons or entities other than the Owner and Contractor. The Architect shall, however, be entitled to performance and enforcement of obligations under the Contract intended to facilitate performance of the Architect's duties.

1.1.3 The Work: The term "Work" means the construction and services required by the Contract Documents, whether completed or partially completed, and includes all other labor, materials, equipment and services provided or to be provided by the Contractor to fulfill the Contractor's obligations. The Work may constitute the whole or a part of the Project. *Notwithstanding the inclusion of "Services" in the meaning of Work, the Architect shall have no responsibility for or control over the means, methods or sequences of construction, and as set forth in Subparagraph 4.2.3. Nor shall such definition of "Work" be construed to extend the responsibilities or services of the Architect beyond those set forth in the Owner/Architect Agreement.*

1.1.4 The Project: The Project is the total construction of which the Work performed under the Contract Documents may be the whole or a part and which may include construction by the Owner or by separate contractors.

1.1.5 The Drawings: The Drawings are the graphic and pictorial portions of the Contract Documents, wherever located and whenever issued, showing the design, location and dimensions of the Work, generally including plans, elevations, sections, details, schedules and diagrams.

1.1.6 The Specifications: The Specifications are that portion of the Contract Documents consisting of the written requirements for materials, equipment, construction systems, standards and workmanship for the Work, and performance of related services.

1.1.7 The Project Manual: The Project Manual is the volume which may be assembled for the Work and which may include the bidding requirements, sample forms, Conditions of the Contract and Specifications.

1.1.8 Other Definitions:

.1 "Equal", "accepted equal", and "approved equal" shall mean as accepted, in writing, by Architect as being of equivalent quality, utility, and appearance.

.2 "By Owner" refers to work which will be performed by the Owner or his/her agents at the Owner's cost.

.3 "By others" refers to work which is not a part of the Contract.

.4 "Furnish" shall mean supply only, do not install.

.5 "Install" means install only, do not furnish.

.6 "Provide" means furnish and install.

.7 The term "as required" shall mean as required by regulatory bodies, by referenced standards, by existing conditions, by generally accepted construction practice, or by the Contract Documents.

.8 Wherever the term "Design/Build" is used, it refers to a procedure whereby a person or other entity assumes responsibility under a single contract for both the design and construction of a portion of the Work. In no event shall the Architect or its consultants be responsible for the technical adequacy or accuracy of the services or work of any Design/Build Contractor, subcontractor or its consultants.

.9 The term "Client" may be used synonymously with the term "Owner".

1.2 Execution, Correlation And Intent

1.2.1 The Contract Documents shall be signed by the Owner and Contractor as provided in the Agreement. If either the Owner or Contractor or both do not sign all the Contract Documents, the Architect shall *assist in* identifying such unsigned Documents upon request.

1.2.2 Execution of the Contract by the Contractor is a representation that the Contractor has visited the site, become familiar with local conditions under which the Work is to be performed and correlated personal observations with requirements of the Contract Documents. *Additionally, the Contractor acknowledges and agrees that the information contained in the Contract Documents is adequate and sufficient for completion of the Work subject to the provisions of Subparagraph 3.2.1.*

1.2.3 The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work by the Contractor. The Contract Documents are complementary, and what is required by one shall be as binding as if required by all; performance by

the Contractor shall be required \ to the extent \ inferable from them as being necessary *for a contractor experienced and expert in this type of construction* to produce the intended results.

1.2.4 Organization of the Specifications into divisions, sections and articles, and arrangement of Drawings shall not control the Contractor in dividing the Work among Subcontractors or in establishing the extent of Work to be performed by any trade. *The inclusion, for convenience in pricing, bidding, permit application, construction or other purposes, of documents prepared by entities other than the Architect or its consultants with documents prepared by the Architect or its consultants shall not imply that the Architect has reviewed, approved or is responsible for their accuracy or completeness.*

1.2.5 Unless otherwise stated in the Contract Documents, words which have well-known technical or construction industry meanings are used in the Contract Documents in accordance with such recognized meanings.

1.2.6 *Conflicts or discrepancies among the Contract Documents shall be resolved in the following order of priority:*

.1 *The Agreement;*

.2 *Amendment and revisions of later date take precedence over those of earlier date;*

.3 *the Supplementary Conditions;*

.4 *the General Conditions;*

.5 *Drawings and Specifications; Drawings govern Specifications for quantity and location, and Specifications govern Drawings for quality and performance. In the event of ambiguity in quantity or quality, the greater quantity and the better quality shall govern.*

1.3 Ownership And Use Of Architect's Drawings, Specifications And Other Documents

1.3.1 The Drawings, Specifications and other documents prepared by the Architect are instruments of the Architect's service through which the Work to be executed by the Contractor is described. The Contractor may retain one contract record set. Neither the Contractor nor any Subcontractor, Sub-subcontractor or material or equipment supplier shall own or claim a copyright in the Drawings, Specifications and other documents prepared by the Architect; \ the Architect shall be deemed the author of *its Drawings, Specifications and other documents* and \ retains all common law, statutory and other reserved rights, including any copyrights. All copies of *the Drawings, Specifications and other documents*, except the Contractor's record set, shall be returned or suitably accounted for to the Architect, on request, upon completion of the Work. The Drawings, Specifications and other documents prepared by the Architect, and copies thereof furnished to the Contractor, are for use solely with respect to this Project. They are not to be used by the Contractor or any Subcontractor, Sub-subcontractor or material or equipment supplier on other projects or for additions to this Project outside the scope of the Work without the specific written consent of the Owner and Architect. The Contractor, Subcontractors, Sub-subcontractors and material or equipment suppliers are granted a limited license to use and reproduce applicable portions of the Drawings, Specifications and other documents prepared by the Architect appropriate to and for use in the execution of their Work under the Contract Documents. All copies made under this license shall bear the statutory copyright notice, if any, shown on the Drawings, Specifications and other documents *and other notices* prepared by the Architect. Submittal or distribution to meet official regulatory requirements or for other purposes in connection with this Project is not to be construed as publication in derogation of the Architect's copyright or other reserved rights. *In the event of any unauthorized use, reuse, or modification to the Architect's Drawings, Specifications and other documents by the contractor, any lower tier contractor or material supplier, or other person or entity under the Contractor's direct or indirect employ, the Contractor agrees to indemnify, defend and hold the Architect and the Owner harmless from and against any and all claims, liabilities, suits, demands, losses, costs and expenses, including, but not limited to, reasonable attorneys' fees and all legal expenses, costs and fees incurred through appeal, and all interest thereon, accruing to or resulting* from *any and all persons, firms, or any other legal* entities, *on account of any damages or losses to property or persons, including,* but not limited to, *death* or economic losses, *arising out of such unauthorized use, reuse or modification of the Architect's Drawings, Specifications and other documents, except where the Architect is found to be solely liable* as between the parties hereto as well as between any other persons, firms or other legal entities *for such damages or losses by a court or forum of competent jurisdiction.*

1.4 Capitalization

1.4.1 Terms capitalized in these General Conditions include those which are (1) specifically defined, (2) the titles of numbered articles and identified references to Paragraphs, Subparagraphs and Clauses in the document or (3) the titles of other documents published by the American Institute of Architects or other body.

1.5 Interpretation

1.5.1 In the interest of brevity the Contract Documents frequently omit modifying words such as "all" and "any" and articles such as "the" and "an," but the fact that a modifier or an article is absent from one statement and appears in another is not intended to affect the interpretation of either statement.

Article 2
OWNER

2.1 Definition

2.1.1 The Owner is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The term "Owner" means the Owner or the Owner's authorized representative.

2.1.2 The Owner upon reasonable written request shall furnish to the Contractor in writing a correct statement of the record legal title to the property on which the Project is located, the Owner's interest therein at the time of execution of the Agreement and, within five days after any change, information of such change in title, recorded or unrecorded.

2.2 Information And Services Required Of The Owner

2.2.1 The Owner shall, at the request of the Contractor, prior to execution of the Agreement \ furnish to the Contractor reasonable evidence that financial arrangements have been made to fulfill the Owner's obligations under the Contract.

2.2.2 The Owner shall furnish surveys or other required information describing physical characteristics, legal limitations and utility locations for the site of the Project, and a legal description of the site.

2.2.3 Except for permits and fees which are the responsibility of the Contractor under the Contract Documents, the Owner shall secure and pay for necessary approvals, easements, assessments and charges required for construction, use or occupancy of permanent structures or for permanent changes in existing facilities.

2.2.4 Information or services under the Owner's control shall be furnished by the Owner with reasonable promptness to avoid delay in orderly progress of the Work.

2.2.5 Unless otherwise provided in the Contract Documents, the Contractor will be furnished, free of charge, such copies of Drawings and Project Manuals as are reasonably necessary for execution of the Work. Additional copies shall be furnished at cost.

2.2.6 The foregoing are in addition to other duties and responsibilities of the Owner enumerated herein and especially those in respect to Article 6 (Construction by Owner or by Separate Contractors), Article 9 (Payments and Completion) and Article 11 (Insurance and Bonds).

2.3 Owner's Right To Stop The Work

2.3.1 If the Contractor fails to correct Work which is not in accordance with the requirements of the Contract Documents as required by Paragraph 12.2 or \ fails to carry out Work in accordance with the Contract Documents, the Owner, by written order signed personally or by an agent specifically so empowered by the Owner in writing, may order the Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, the right of the Owner to stop the Work shall not give rise to a duty on the part of the Owner to exercise this right for the benefit of the Contractor or any other person or entity, except to the extent required by Subparagraph 6.1.3.

2.4 Owner's Right To Carry Out The Work

2.4.1 If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents and fails within a seven-day period after receipt of written notice from the Owner to commence and continue correction of such default or neglect with diligence and promptness, \ the Owner may, without prejudice to other remedies the Owner may have, correct such deficiencies. \ *The Owner may offset* from payments then or thereafter due the Contractor the cost of correcting such deficiencies, including compensation for the Architect's additional services and expenses made necessary by such default, neglect or failure. \ If payments then or thereafter due the Contractor are not sufficient to cover such amounts, the Contractor shall pay the difference to the Owner.

Article 3
CONTRACTOR

3.1 Definition

3.1.1 The Contractor is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The term "Contractor" means the Contractor or the Contractor's authorized representative.

3.2 Review Of Contract Documents And Field Conditions By Contractor

3.2.1 The Contractor shall carefully study and compare the Contract Documents with each other and with the information furnished by the Owner pursuant to Subparagraph 2.2.2 and shall at once report to the Architect errors, inconsistencies or omissions discovered *or any variance from applicable laws, codes or regulations.* The Contractor shall \ be liable \ for damage resulting from \ *Contractor's failure to report such discovery or its performance of any construction activity if it knows or should have known of such error, inconsistency, omission or violation.*

3.2.2 The Contractor shall, *sufficiently in advance of undertaking the Work,* take field measurements and verify field conditions and shall carefully compare such field measurements and conditions and other information known to the Contractor with the Contract Documents. \ Errors, inconsistencies or omissions discovered shall be reported to the Architect at once. *If the Contractor performs any construction activity which involves an error, inconsistency or omission which the Contractor knew of or should reasonably have known of, without notice to the Architect, the Contractor shall assume responsibility for such performance and shall bear all costs of correction.*

3.2.3 The Contractor shall perform the Work in accordance with the Contract Documents and submittals \ pursuant to Paragraph 3.12.

3.2.4 *Prior to starting the Work and with sufficient lead time to avoid any job schedule impacts, Contractor shall review any specified construction and installation procedures and shall advise Architet prior to commencing related activities if any such procedures would result in finished Work would not be in conformance with the intent of the Contract Documents.*

3.3 Supervision And Construction Procedures

3.3.1 The Contractor shall supervise and direct the Work, using the Contractor's best skill and attention. The Contractor shall be solely responsible for and have control over construction means, methods, techniques, sequences and procedures *including safety programs and procedures,* and for coordinating all portions of the Work under the Contract. \

3.3.2 The Contractor shall be responsible to the Owner for acts and omissions of the Contractor's employees, Subcontractors and their agents and employees, and other *persons or entities directly or indirectly employed by them* performing portions of the Work under a contract with the Contractor.

3.3.3 The Contractor shall not be relieved of obligations to perform the Work in accordance with the Contract Documents *nor shall the Contractor's liability be diminished* either by activities or duties of the Architect in the Architect's administration of the Contract, or by tests, inspections or approvals required or performed by persons other than the Contractor.

3.3.4 The Contractor shall be responsible for inspection of portions of Work already performed under this Contract, *as well as existing conditions,* to determine that such \ are in proper condition to receive subsequent Work.

3.4 Labor And Materials

3.4.1 Unless otherwise provided in the Contract Documents, the Contractor shall *in a timely manner so as to not delay the progress of the Work* provide and pay for labor, materials, equipment, tools, construction equipment and machinery, water, heat, utilities, transportation, and other facilities and services necessary for proper execution and completion of the Work, whether temporary or permanent and whether or not incorporated or to be incorporated in the Work.

3.4.2 The Contractor shall enforce strict discipline and good order among the Contractor's employees and other persons carrying out the Contract. The Contractor shall not permit employment of unfit persons or persons not skilled in tasks assigned to them.

3.4.3 *Where substitutions of materials or equipment is permitted by the Contract, request for such substitution shall be made in a timely manner in full compliance with Contract requirements.*

3.4.4 *In making a request for substitution, the Contractor represents that*

.1 *the Contractor has investigated the proposed substitution and has determined that it is equal to or superior in all respects to that specified, including warranties.*

.2 *that the cost data presented with the request for substitution is complete and includes all costs of labor, materials, equipment, profits and overhead as well as any costs required to adapt and/or coordinate the substitution with adjacent or existing construction.*

3.5 Warranty

3.5.1 The Contractor warrants to the Owner and Architect that materials and equipment furnished under the Contract will be of good quality and new unless otherwise required or permitted by the Contract Documents, that the Work will be free from defects \ and that the Work will conform with the requirements of the Contract Documents. Work not conforming to these requirements, including substitutions not properly approved and authorized, *shall* be considered defective. The Contractor's warranty excludes remedy for damage or defect caused by abuse, modifications not executed by the Contractor, improper or insufficient maintenance, improper operation, or normal wear and tear under normal usage. If required by the *Owner or* Architect, the Contractor shall furnish satisfactory evidence *including certifications when requested* as to the kind and quality of materials and equipment.

3.6 Taxes

3.6.1 The Contractor shall pay sales, consumer, use and similar taxes for the Work or portions thereof provided by the Contractor which are legally enacted when bids are received or negotiations concluded, whether or not yet effective or merely scheduled to go into effect.

3.7 Permits, Fees And Notices

3.7.1 Unless otherwise provided in the Contract Documents, the Contractor shall secure and pay for the building permit and other permits and governmental fees, licenses and inspections necessary for proper execution and completion of the Work which are customarily secured after execution of the Contract and which are legally required when bids are received or negotiations concluded.

3.7.2 The Contractor shall comply with and give notices required by laws, ordinances, rules, regulations and lawful orders of public authorities bearing on performance of the Work.

3.7.3 It is not the Contractor's responsibility to ascertain that the Contract Documents are in accordance with applicable laws, statutes, ordinances, building codes, and rules and regulations. However, if the Contractor observes *or should have observed as an experienced contractor* that portions of the Contract Documents are at variance therewith, the Contractor shall promptly notify the Architect and Owner in writing, and necessary changes shall be accomplished by appropriate Modification.

3.7.4 If the Contractor performs Work \ *which it knows or in the ordinary course of business as an experienced contractor should have known* it to be contrary to laws, statutes, ordinances, building codes, and rules and regulations without such notice to the Architect and Owner, the Contractor shall assume full responsibility for such Work and shall bear the attributable costs.

3.8 Allowances

3.8.1 The Contractor shall include in the Contract Sum all allowances stated in the Contract Documents. Items covered by allowances shall be supplied for such amounts and by such persons or entities as the Owner may direct, but the Contractor shall not be required to employ persons or entities against which the Contractor makes reasonable objection.

3.8.2 Unless otherwise provided in the Contract Documents:

.1 materials and equipment under an allowance shall be selected promptly by the Owner to avoid delay in the Work;

.2 allowances shall cover the cost to the Contractor of materials and equipment delivered at the site and all required taxes, less applicable trade discounts;

.3 Contractor's costs for unloading and handling at the site, labor, installation costs, overhead, profit and other expenses contemplated for stated allowance amounts shall be included in the Contract Sum and not in the allowances;

.4 whenever costs are more than or less than allowances, the Contract Sum shall be adjusted accordingly by Change Order. The amount of the Change Order shall reflect (1) the difference between actual costs and the allowances under Clause 3.8.2.2 and (2) changes in Contractor's costs under Clause 3.8.2.3.

3.9 Superintendent

3.9.1 The Contractor shall employ a competent superintendent and necessary assistants who shall be in attendance at the Project site during performance of the Work. *The superintendent shall be approved by the Owner and shall not be replaced without Owner's prior approval. The superintendent shall be familiar with the job site, the Contract Documents, and all applicable rules, regulations and requirements of all authorities having jurisdiction over the Work or the site.* The superintendent shall represent the Contractor, and communications given to the superintendent shall be as binding as if given to the Contractor. Important communications shall be confirmed in writing. Other communications shall be similarly confirmed on \ request in each case, *and as set forth in Subparagraph 4.2.4.*

3.10 Contractor's Construction Schedules

3.10.1 The Contractor, promptly after being awarded the Contract, shall prepare and submit for the Owner's and Architect's information a Contractor's construction schedule for the Work. \ *Such schedule shall be a computer generated critical path method (CPM) schedule showing at a minimum,*

.1 the early and late start time for each major construction activity;

.2 all "critical path" activities and their duration;

.3 late order dates for all long lead time materials and equipment;

.4 critical owner decision dates.

The schedule shall not exceed time limits current under the Contract Documents, shall be revised at appropriate intervals as required by the conditions of the Work and Project, shall be related to the entire Project to the extent required by the Contract Documents, and shall provide for expeditious and practicable execution of the Work.

3.10.2 The Contractor shall, *in consultation with the Architect,* prepare and keep current, for the Architect's approval, a schedule of *required* submittals which is coordinated with the Contractor's construction schedule and allows the Architect reasonable time to review submittals.

3.10.3 The Contractor shall conform to the most recent schedules.

***3.10.4** Failure of the Contractor to submit or keep current the construction schedule and submittals schedule as required by the conditions of the Work, shall be grounds for withholding of payments due the Contractor by the Owner, until such schedules are provided.*

3.11 Documents And Samples At The Site

3.11.1 The Contractor shall maintain at the site for the Owner one record copy of the Drawings, Specifications, addenda, Change Orders and other Modifications, *as well as one copy of the approved permit set,* in good order and marked currently to record changes and selections made during construction, and in addition *reviewed* Shop Drawings, Product Data, Samples and similar required submittals. These shall be available to the Architect and shall be delivered to the Architect for submittal to the Owner upon completion of the Work.

3.12 Shop Drawings, Product Data And Samples

3.12.1 Shop Drawings are drawings, diagrams, schedules and other data specially prepared for the Work by the Contractor or a Subcontractor, Sub-subcontractor, manufacturer, supplier or distributor to illustrate some portion of the Work.

3.12.2 Product Data are illustrations, standard schedules, performance charts, instructions, brochures, diagrams and other information furnished by the Contractor to illustrate materials or equipment for some portion of the Work.

3.12.3 Samples are physical examples which illustrate materials, equipment or workmanship and establish standards by which the Work will be judged.

3.12.4 Shop Drawings, Product Data, Samples and similar submittals are not Contract Documents. The purpose of their submittal is to demonstrate for those portions of the Work for which submittals are required the way the Contractor proposes to conform to the \ *visual and aesthetic* design concept expressed in the Architect's Drawings and Specifications. Review by the Architect is subject to the limitations of Subparagraph 4.2.7.

3.12.5 The Contractor shall review, approve and submit to the Architect Shop Drawings, Product Data, Samples and similar submittals required by the Contract Documents with reasonable promptness and \ *in accordance with the approved submittal schedule as set forth in Subparagraph 3.10.2, so* as to cause no delay in the Work or in the activities of the Owner or of separate contractors. Submittals made by the Contractor which are not required by the Contract Documents may be returned *by the Architect* without action.

3.12.6 The Contractor shall perform no portion of the Work requiring submittal and review of Shop Drawings, Product Data, Samples or similar submittals until the respective submittal has been \ *reviewed and returned* by the Architect. Such Work shall be in accordance with *reviewed* submittals.

3.12.7 By approving and submitting Shop Drawings, Product Data, Samples and similar submittals, the Contractor represents that the Contractor has determined and verified materials, field measurements and field construction criteria related thereto, or will do so, and has checked and coordinated the information contained within such submittals with the requirements of the Work and of the Contract Documents. *Incomplete, uncoordinated or incorrect Shop Drawings and other submittals shall be returned to the Contractor who shall be held responsible for all time delays and extra costs of review or handling by Architect or Owner, because of such submittals being incomplete, uncoordinated or incorrect.*

3.12.8 The Contractor shall not be relieved of responsibility for deviations *or omissions* from requirements of the Contract Documents by the Architect's *review* of Shop Drawings, Product Data, Samples or similar submittals unless the Contractor has specifically informed the Architect in writing of such deviation *or omission* at the time of submittal and the Architect has given written approval to the specific deviation *or omission*. The Contractor shall not be relieved of responsibility for errors or omissions in Shop Drawings, Product Data, Samples or similar submittals by the Architect's \ *review or action thereon.*

3.12.9 The Contractor shall direct specific attention, in writing or on resubmitted Shop Drawings, Product Data, Samples or similar submittals, to revisions other than those requested by the Architect on previous submittals.

3.12.10 \ *Submittals shall not be used as a substitution for Change Orders or other procedures required by the Contract Documents, and shall not constitute approval or authorization for change in the Contract Documents, which change may be made only through an approved Change Order or directive in accordance with Subparagraph 7.1*

3.12.11 When \ certification of performance criteria of materials, systems or equipment is required by the Contract Documents, the Architect *and Owner* shall be entitled to rely upon the *authenticity,* accuracy and completeness of such calculations and certifications.

3.13 Use Of Site

3.13.1 The Contractor shall confine operations at the site to areas permitted by law, ordinances, permits and the Contract Documents and shall not unreasonably encumber the site with materials or equipment. *For purposes of this provision, "site" shall include all existing structures.*

3.14 Cutting And Patching

3.14.1 The Contractor shall be responsible for cutting, fitting or patching required to complete the Work or to make its parts fit together properly.

3.14.2 The Contractor shall not damage or endanger a portion of the Work or fully or partially completed construction of the Owner or separate contractors by cutting, patching or otherwise altering such construction, or by excavation, \ except with written consent of the Owner and of such separate contractor; such consent shall not be unreasonably withheld. The Contractor shall not unreasonably withhold from the Owner or a separate contractor the Contractor's consent to cutting or otherwise altering the Work.

3.15 Cleaning Up

3.15.1 The Contractor shall *at all times* keep the premises and surrounding area free from accumulation of waste materials or rubbish caused by operations under the Contract. At completion of the Work the Contractor shall remove from and about the Project waste materials, rubbish, the Contractor's tools, construction equipment, machinery and surplus materials.

3.15.2 If the Contractor fails to clean up as provided in the Contract Documents, the Owner may do so and the cost thereof shall be charged to the Contractor.

3.16 Access To Work

3.16.1 The Contractor shall provide the Owner and Architect access to *all portions of* the Work in preparation and progress wherever located.

3.17 Royalties And Patents

3.17.1 The Contractor shall pay all royalties and license fees. The Contractor shall defend suits or claims for infringement of patent rights and shall hold the Owner and Architect harmless from loss on account thereof, but shall not be responsible for such defense or loss when a particular design, process or product of a particular manufacturer or manufacturers is required by the Contract Documents. However, if the Contractor has reason to believe that the required design, process or product is an infringement of a patent, the Contractor shall be responsible for such loss unless such information is promptly furnished to the Architect.

3.18 Indemnification

3.18.1 \ The Contractor shall indemnify, *defend* and hold harmless the Owner, Architect, Architect's consultants, and *partners, shareholders, officers, directors,* agents and employees of any of them from and against *all* claims, *liabilities, suits, demands,* \ losses, *costs* and expenses, including, but not limited to *reasonable* attorneys' *and consultants'* fees, *and all legal expenses, and fees incurred through appeal, and all interest thereon, accruing to or resulting from any and all persons, firms or any other legal entities, on account of any damages or losses to property or persons, including, but not limited to, death or economic losses,* arising out of or resulting from performance of the Work, \ *whether* caused in

whole or in part by \ *the performance or nonperformance* of the Contractor, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, regardless of whether or not such claims, damages, losses or expenses *are* caused in part by a party indemnified hereunder *to the extent such has been finally adjudicated*. Such obligation shall not be construed to negate, abridge, or reduce other rights or obligations of indemnity *that* would otherwise exist as to a party or person described in this Paragraph 3.18. *The above indemnification shall survive completion or termination of the Work.*

3.18.2 In claims against any person or entity indemnified under this Paragraph 3.18 by an employee of the Contractor, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, the indemnification obligation under this Paragraph 3.18 shall not be limited by a limitation on amount or type of damages, compensation or benefits payable by or for the Contractor or a Subcontractor under workers' \ compensation acts, disability benefit acts or other employee benefit acts.

3.18.3 The obligations of the Contractor under this Paragraph 3.18 shall not extend to the *extent of proven* liability of the Architect, the Architect's consultants, and agents and employees of any of them arising out of (1) the preparation or approval of maps, drawings, opinions, reports, surveys, Change Orders, designs or specifications, or (2) the giving of or the failure to give directions or instructions by the Architect, the Architect's consultants, and agents and employees of any of them provided such giving or failure to give is the primary cause of the injury or damage.

Article 4
ADMINISTRATION OF THE CONTRACT

4.1 Architect

4.1.1 The Architect is the person lawfully licensed to practice architecture or an entity lawfully practicing architecture identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The term "Architect" means the Architect or the Architect's authorized representative.

4.1.2 Duties, responsibilities and limitations of authority of the Architect as set forth in *the Agreement between Owner and Architect and* the Contract Documents shall not be restricted, modified or extended without written consent of the Owner, \ and Architect. \ *The Architect will not perform services in connection with, and will have no responsibility for any portions of the Work or Project for which documents are provided by others, whether or not such documents are bound together with the Architect's Drawings, Specifications and other documents.*

4.1.3 In case of termination of employment of the Architect, the Owner shall appoint an architect \ whose status under the Contract Documents shall be that of the former architect.

\

4.2 Architect's Administration Of The Contract

4.2.1 The Architect will provide administration of the Contract \ and will be the Owner's representative *as described in the Owner-Architect Agreement.* \ The Architect will advise and consult with the Owner. The Architect will have authority to act on behalf of the Owner only to the extent provided in the Contract Documents, unless otherwise modified by written instrument in accordance with other provisions of the Contract.

4.2.2 The Architect will visit the site at intervals \ *necessary in the judgment of the Architect or as otherwise agreed by the Owner and Architect in writing* to become generally familiar with the progress and quality of the *Work* completed and to determine in general if the Work \ completed *is* \ in accordance with the Contract Documents. However, the Architect will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the Work. On the basis of on-site observations as an architect, the Architect will keep the Owner informed of the progress and quality of the Work. \

4.2.3 The Architect will not have control over or charge of and will not be responsible for construction means, methods, techniques, *schedules*, sequences or procedures, *fabrication, procurement, shipment, delivery, receipt or installation* or for safety precautions and programs in connection with the Work, since these are solely the Contractor's responsibility as provided in Paragraph 3.3 *or elsewhere in the Contract Documents*. The Architect will not be responsible for the Contractor's, *Subcontractors', suppliers' or any other person's or entity's schedules or* failure to carry out the Work in accordance with the Contract Documents. The Architect will not have control over or charge of \ acts or omissions of the Contractor, Subcontractors, or their agents or employees, or of any other persons or entities performing or *supplying* portions of the Work. *The Architect's duties shall not extend to the receipt, inspection and acceptance on behalf of the Owner or Contractor of materials, furniture, furnishings and equipment at the time of their delivery to the premises or installation. The Contractor shall not be relieved of obligations to perform the Work in accordance with the Contract Documents either by activities or duties of the Architect in the Architect's administration of the Contract for Construction, or by tests, inspections or approvals required or performed by persons other than the Contractor. If the Architect recommends procedures, either directly or by reference to standards or manufacturers' recommendations, the Contractor shall adopt such recommendations as its own, or inform the Architect if exception is taken to such procedures, and may utilize or propose alternative procedures that the Contractor will warrant as fulfilling the intent of the Contract Documents.*

4.2.4 Communications Facilitating Contract Administration: Except as otherwise provided in the Contract Documents or when direct communications have been specially authorized, the Owner and Contractor shall \ communicate through the Architect. Communications by and with the Architect's consultants shall be through the Architect. Communications by and with Subcontractors and material suppliers shall be through the Contractor. \ *Should any direct communication become necessary, copies of the communication shall be promptly forwarded to the proper party or parties as set forth in this Subparagraph.*

4.2.5 Based on the Architect's observations, and \ the Contractor's Applications for Payment, the Architect will review and *make recommendations to the Owner regarding* the amounts due the Contractor \ *on the Architect's* Certificates for Payment *forms.* \

4.2.6 The Architect will have authority to *recommend to the Owner that the Owner* reject Work which does not conform to the Contract Documents. Whenever the Architect considers it necessary or advisable for implementation of the intent of the Contract Documents, the Architect will have authority to *recommend to the Owner that the Owner* require additional inspection or testing of the Work in accordance with Subparagraphs 13.5.2 and 13.5.3 whether or not such Work is fabricated, installed or completed. However, neither this authority of the Architect nor a decision \ either to exercise or not to exercise such authority shall give rise to a duty or responsibility of the Architect to the Contractor, Subcontractors, material and equipment suppliers, their agents or employees or other persons *or entities* performing *or supplying* portions of the Work.

4.2.7 The Architect will review and \ take appropriate action upon \ *those* Shop Drawings, Product Data and Samples *required of the Contractor by the Contract Documents*, but only for the limited purpose of checking for *general* conformance with \ the *visual and aesthetic* design concept *as* expressed in the *Architect's* \ *Drawings and Specifications. The Architect shall not be responsible for any deviations between the Shop Drawings and differing information or conditions in the Contract Documents and field conditions, respectively.* The Architect's action will be taken with such reasonable promptness as to cause no delay in the Work or in the *construction* of the Owner,

Contractor or separate contractors, while allowing sufficient time in the Architect's professional judgment to permit adequate review *in accordance with the submittal schedule.* Review of such submittals is not conducted for the purpose of determining or *substantiating the* accuracy and completeness of other details such as dimensions and quantities or for substantiating instructions for installation or performance of equipment or systems *designed by the Contractor*, all of which remain the responsibility of the Contractor as required by the Contract Documents. The Architect's review \ shall not relieve the Contractor of the obligations under Paragraphs 3.3, 3.5 and 3.12. The Architect's review shall not constitute approval of safety precautions or \ of any construction means, methods, techniques, sequences, procedures *or fabrication.* The Architect's \ *action on* a specific item shall not indicate approval of an assembly of which the item is a component. *The Architect's approval of a color or finish sample for an item shall not constitute approval of that item as delivered and installed if it does not conform to the Contract Documents.*

4.2.8 The Architect *may* prepare Change Orders and Construction Change Directives, and may authorize minor changes in the Work as provided in Paragraph 7.4.

4.2.9 The Architect will conduct \ *field reviews of the Work as set forth in Paragraph 9.8* to determine the date or dates of Substantial Completion and the date of final completion, will receive and forward to the Owner for the Owner's review and records written warranties and related documents required by the Contract *Documents* and assembled by the Contractor, and will issue a final Certificate for Payment *as set forth in Paragraph 9.10.* \ *The handling by the Architect of warranties, maintenance manuals or similar documents shall not diminish or transfer to the Architect any responsibilities or liabilities required by the Contract Documents of the Contractor or other entities or persons performing or supplying the Work.*

4.2.10 If the Owner and Architect agree, the Architect will provide one or more project representatives to assist in carrying out the Architect's responsibilities at the site. The duties, responsibilities and limitations of authority of such project representatives shall be as set forth in an exhibit to be incorporated in the Contract Documents.

4.2.11 The Architect will \ *provide written or graphic interpretations* concerning \ *the* requirements of the Contract Documents \ with reasonable promptness *as necessary or upon request of the Owner or Contractor.* \ *The Architect will not be liable for interpretations rendered in good faith.*

4.2.12 *The Architect's* interpretations \ will be consistent with the *Architect's* intent \ *as expressed in, or* reasonably inferable from the Contract Documents \.

4.2.13 The Architect's decisions on matters relating to aesthetic effect *or visual design effect* will be final if consistent with the intent expressed in *and reasonably inferable from* the Contract Documents *and the Architect shall not be liable for interpretations so rendered.*

4.3 Claims And Disputes

4.3.1 Definition: A Claim is a demand or assertion by one of the parties seeking, as a matter of right, adjustment or interpretation of Contract terms, payment of money, extension of time or other relief with respect to the terms of the Contract. The term "Claim" also includes other disputes and matters in question between the Owner and Contractor arising out of or relating to the Contract. Claims must be made by written notice. The responsibility to substantiate Claims shall rest with the party making the Claim.

4.3.2 *Referral to* \ **Architect:** Claims, including those alleging an error or omission by the Architect, *may* be referred initially to the Architect for action as provided in Paragraph 4.4. *If the Architect agrees to hear such claims, the Architect shall be entitled to additional Compensation for services to be rendered.* \

4.3.3 Time Limits on Claims: Claims by either party must be made within 21 days after occurrence of the event giving rise to such Claim or within 21 days after the claimant first recognizes the condition giving rise to the Claim, whichever is later. Claims must be made by written notice. An additional Claim made after the initial Claim has been implemented by Change Order will not be considered unless submitted in a timely manner.

4.3.4 Continuing Contract Performance: Pending final resolution of a Claim \ *or dispute* unless otherwise agreed in writing, the Contractor shall proceed diligently with performance of the Contract and the Owner shall continue to make payments in accordance with the Contract Documents.

4.3.5 Waiver of Claims: Final Payment. The making of final payment shall constitute a waiver of Claims by the Owner except those arising from:

.1 liens, Claims, security interests or encumbrances arising out of the Contract and unsettled;

.2 failure of the Work to comply with the requirements of the Contract Documents; or

.3 terms of special warranties required by the Contract Documents.

4.3.6 Claims for Concealed or Unknown Conditions: If conditions are encountered at the site which are (1) subsurface or otherwise concealed physical conditions which differ materially from those indicated in the Contract Documents or (2) unknown physical conditions of an unusual nature, which differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the Contract Documents, *and if the Owner and the Contractor cannot reach an agreement as to how to proceed,* then notice by the observing party shall be given to the other party promptly before conditions are disturbed and in no event later than 21 days after first observance of the conditions. The Architect will promptly investigate such conditions and, if they differ materially and cause an increase or decrease in the Contractor's cost of, or time required for, performance of any part of the Work, will recommend an equitable adjustment in the Contract Sum or Contract Time, or both. If the Architect *finds* that the conditions at the site are not materially different from those indicated in the Contract Documents and that no change in the terms of the Contract is justified, the Architect shall so notify the Owner and Contractor in writing, stating the reasons. Claims by either party in opposition to such *notice* must be made within 21 days after the Architect has given notice of the decision. If the Owner and Contractor cannot agree on an adjustment in the Contract Sum or Contract Time, the adjustment *may* be referred to the Architect for initial determination, subject to further proceedings pursuant to Paragraph 4.4.

4.3.7 Claims for Additional Cost: If the Contractor wishes to make Claim for an increase in the Contract Sum, written notice as provided herein shall be given before proceeding to execute the Work. Prior notice is not required for Claims relating to an emergency endangering life or property arising under Paragraph 10.3. If the Contractor believes additional cost is involved for reasons including but not limited to (1) a written interpretation from the Architect, (2) an order by the Owner to stop the Work where the Contractor was not at fault, (3) a written order for a minor change in the Work issued by the Architect, (4) failure of payment by the Owner, (5) termination of the Contract by the Owner, (6) Owner's suspension or (7) other reasonable grounds, Claim shall be filed in accordance with the procedure established herein.

4.3.8 Claims for Additional Time

4.3.8.1 If the Contractor wishes to make Claim for an increase in the Contract Time, written notice as provided herein shall be given. The Contractor's Claim shall include an estimate of cost and of probable effect of delay on progress of the Work. In the case of a continuing delay

only one Claim is necessary. *Claim for delay may only be made if the delay adversely affects the critical path of the Contractor's schedule and adversely affects a portion of the Work that must be completed as scheduled to avoid delay to the final completion of the Work as a whole.*

4.3.8.2 If adverse weather conditions are the basis for a Claim for additional time, such Claim shall be documented by data substantiating that weather conditions were abnormal for the period of time and could not have been reasonably anticipated, and that weather conditions had an adverse effect on the *critical path of the Contractor's schedule for construction.*

4.3.9 Injury or Damage to Person or Property. If either party to the Contract suffers injury or damage to person or property because of an act or omission of the other party, of any of the other party's employees or agents, or of others for whose acts such party is legally liable, written notice of such injury or damage, whether or not insured, shall be given to the other party within a reasonable time not exceeding 21 days after first observance. The notice shall provide sufficient detail to enable the other party to investigate the matter. \

4.4 Resolution Of Claims And Disputes

4.4.1 The Architect *may at the Architect's sole discretion* review Claims and take one or more of the following preliminary actions within ten days of receipt of a Claim: (1) request additional supporting data from the claimant, (2) submit a schedule to the parties indicating when the Architect expects to take action, (3) reject the Claim in whole or in part, stating reasons for rejection, (4) recommend approval of the Claim by the other party or (5) suggest a compromise. The Architect may also, but is not obligated to, notify the surety, if any, of the nature and amount of the Claim.

4.4.2 If a Claim has been resolved *and the Architect was involved in the Resolution of Claim as set forth in Subparagraph 4.4.1,* the Architect will prepare or obtain appropriate documentation.

4.4.3 If a Claim has not been resolved, the party making the Claim shall, within ten days after the Architect's preliminary response, take one or more of the following actions: (1) submit additional supporting data requested by the Architect, (2) modify the initial Claim or (3) notify the Architect that the initial Claim stands.

4.4.4 If a Claim has not been resolved after consideration of the foregoing and of further evidence presented by the parties or requested by the Architect, the Architect will notify the parties in writing that the Architect's decision will be made within seven days. \ Upon expiration of such time period, the Architect will render to the parties the Architect's written decision relative to the Claim, including any change in the Contract Sum or Contract Time or both. If there is a surety and there appears to be a possibility of a Contractor's default, the Architect may, but is not obligated to, notify the surety and request the surety's assistance in resolving the controversy.

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4.5 Dispute Resolution

4.5.1 *Precedent to any other legal action, claims, disputes or other matters in question between the parties to this Agreement arising out of or relating to this Agreement or breach thereof shall be subject to good faith mediation under the auspices of a recognized, neutral third-party professional mediation service, or other mediation method acceptable to both parties. The cost of the mediation service shall be borne equally by the parties.*

4.5.2 Attorneys' Fees; Prevailing Party: *Should any proceeding be commenced between the parties to this Agreement seeking to enforce any of its provisions, the prevailing party in such proceeding shall be entitled, in addition to such other relief as may be granted, to a reasonable sum for attorneys' fees and all legal expenses and fees incurred through appeal, which shall be determined by the court or forum in such proceeding or in a separate action brought for that purpose. For the purpose of this provision, "prevailing party": shall include a party which dismisses an action for recovery hereunder in exchange for payment of the sum alleged due, performance of the covenants alleged breached, or consideration substantially equal to the relief sought in the action or proceeding.*

Article 5
SUBCONTRACTORS

5.1 Definitions

5.1.1 A Subcontractor is a person or entity who has a direct contract with the Contractor to perform a portion of the Work. \ The term "Subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Subcontractor or an authorized representative of the Subcontractor. The term "Subcontractor" does not include a separate contractor or subcontractors of a separate contractor.

5.1.2 A Sub-subcontractor is a person or entity who has a direct or indirect contract with a Subcontractor to perform a portion of the Work. \ The term "Sub-subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Sub- subcontractor or an authorized representative of the Sub- subcontractor.

5.2 Award Of Subcontracts And Other Contracts For Portions Of The Work

5.2.1 Unless otherwise stated in the Contract Documents or the bidding requirements, the Contractor, \ *within five days* after award of the Contract, shall furnish in writing to the Owner through the Architect the names of persons or entities (including those who are to furnish materials or equipment fabricated to a special design) proposed for each principal portion of the Work. The Architect will promptly reply to the Contractor in writing stating whether or not the Owner \ has reasonable objection to any such proposed person or entity. Failure of the Owner or Architect to reply \ *in a timely manner* shall constitute notice of no reasonable objection. *Notwithstanding the Owner's right to investigate the suitability of any listed Subcontractor or material supplier, he shall have no duty to do so.*

5.2.2 The Contractor shall not contract with a proposed person or entity to whom the Owner \ has made reasonable and timely objection. The Contractor shall not be required to contract with anyone to whom the Contractor has made reasonable objection.

5.2.3 If the Owner \ has reasonable objection to a person or entity proposed by the Contractor, the Contractor shall propose another to whom the Owner \ has no reasonable objection. The Contract Sum shall be increased or decreased by the difference in cost occasioned by such change and an appropriate Change Order shall be issued. However, no increase in the Contract Sum shall be allowed for such change unless the Contractor has acted promptly and responsively in submitting names as required.

5.2.4 The Contractor shall not change a Subcontractor, person or entity previously selected if the Owner \ makes reasonable objection to such change.

5.3 Subcontractual Relations

5.3.1 By appropriate agreement, written where legally required for validity, the Contractor shall require each Subcontractor, to the extent of the Work to be performed by the Subcontractor, to be bound to the Contractor by terms of the Contract Documents, and to assume toward the Contractor all the obligations and responsibilities which the Contractor, by these Documents, assumes toward the Owner and Architect. Each subcontract agreement shall preserve and protect the rights of the Owner and Architect under the Contract Documents with

respect to the Work to be performed by the Subcontractor so that subcontracting thereof will not prejudice such rights, and shall allow to the Subcontractor, unless specifically provided otherwise in the subcontract agreement, the benefit of all rights, remedies and redress against the Contractor that the Contractor, by the Contract Documents, has against the Owner. Where appropriate, the Contractor shall require each Subcontractor to enter into similar agreements with Sub-subcontractors. The Contractor shall make available to each proposed Subcontractor, prior to the execution of the subcontract agreement, copies of the Contract Documents to which the Subcontractor will be bound, and, upon written request of the Subcontractor, identify to the Subcontractor terms and conditions of the proposed subcontract agreement which may be at variance with the Contract Documents. Subcontractors shall similarly make copies of applicable portions of such documents available to their respective proposed Sub-subcontractors.

5.3.2 The Contractor shall require each Subcontractor to waive any right the Subcontractor may have against the Owner for damage caused by fire or other perils which may be covered by property insurance available to Subcontractor.

5.4 Contingent Assignment Of Subcontracts

5.4.1 Each subcontract agreement for a portion of the Work is assigned by the Contractor to the Owner provided that:

.1 assignment is effective only after termination of the Contract by the Owner \ and only for those subcontract agreements which the Owner accepts by notifying the Subcontractor in writing; and

.2 assignment is subject to the prior rights of the surety, if any, obligated under bond relating to the Contract.

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Article 6
CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

6.1 Owner's Right To Perform Construction And To Award Separate Contracts

6.1.1 The Owner reserves the right to perform construction or operations related to the Project with the Owner's own forces, and to award separate contracts in connection with other portions of the Project or other construction or operations on the site \. If the Contractor claims that delay or additional cost is involved because of such action by the Owner, the Contractor shall make such Claim as provided elsewhere in the Contract Documents.

6.1.2 When separate contracts are awarded for different portions of the Project or other construction or operations on the site, the term "Contractor" in the Contract Documents in each case shall mean the Contractor who executes each separate Owner-Contractor Agreement.

6.1.3 The Owner shall provide for coordination of the activities of the Owner's own forces and of each separate contractor with the Work of the Contractor, who shall cooperate with them. The Contractor shall participate with other separate contractors and the Owner in reviewing their *and the Owner's* construction schedules when directed to do so. The Contractor shall make any revisions to the construction schedule and Contract Sum deemed necessary after a joint review and mutual agreement. The construction schedules shall then constitute the schedules to be used by the Contractor, separate contractors and the Owner until subsequently revised.

6.1.4 Unless otherwise provided in the Contract Documents, when the Owner performs construction or operations related to the Project with the Owner's own forces, the Owner shall be deemed to be subject to the same obligations and to have the same rights which apply to the Contractor under the Conditions of the Contract \.

6.2 Mutual Responsibility

6.2.1 The Contractor shall afford the Owner and separate contractors reasonable opportunity for introduction and storage of their materials and equipment and performance of their activities and shall connect and coordinate the Contractor's construction and operations with theirs as required by the Contract Documents.

6.2.2 If part of the Contractor's Work depends for proper execution or results upon construction or operations by the Owner or a separate contractor, the Contractor shall, prior to proceeding with that portion of the Work, promptly report to the Architect apparent discrepancies or defects in such other construction that would render it unsuitable for such proper execution and results. Failure of the Contractor so to report shall constitute an acknowledgment that the Owner's or separate contractors' completed or partially completed construction is fit and proper to receive the Contractor's Work, except as to defects not then reasonably discoverable.

6.2.3 Costs caused by delays or by improperly timed activities or defective construction shall be borne by the party responsible therefor.

6.2.4 The Contractor shall promptly remedy damage \ caused by the Contractor to completed or partially completed construction or to property of the Owner or separate contractors \.

6.2.5 Claims and other disputes and matters in question between the Contractor and a separate contractor shall be subject to the provisions of Paragraph 4.3 provided the separate contractor has reciprocal obligations.

6.2.6 The Owner and each separate contractor shall have the same responsibilities for cutting and patching as are described for the Contractor in Paragraph 3.14.

6.3 Owner's Right To Clean Up

6.3.1 If a dispute arises among the Contractor, separate contractors and the Owner as to the responsibility under their respective contracts for maintaining the premises and surrounding area free from waste materials and rubbish as described in Paragraph 3.15, the Owner may clean up and allocate the cost among those responsible \.

Article 7
CHANGES IN THE WORK

7.1 Changes

7.1.1 Changes in the Work may be accomplished after execution of the Contract, and without invalidating the Contract, by Change Order, Construction Change Directive or order for a minor change in the Work, subject to the limitations stated in this Article 7 and elsewhere in the Contract Documents.

7.1.2 A Change Order shall be based upon agreement \ *between* the Owner *and* Contractor \ ; a Construction Change Directive \ *may be issued* by the Owner *or* Architect and may or may not be agreed to by the Contractor; an order for a minor change in the Work may be issued by the Architect alone.

7.1.3 Changes in the Work shall be performed under applicable provisions of the Contract Documents, and the Contractor shall proceed promptly, unless otherwise provided in the Change Order, Construction Change Directive or order for a minor change in the Work.

7.1.4 If unit prices are stated in the Contract Documents or subsequently agreed upon, and if quantities originally contemplated are so changed in a proposed Change Order or Construction Change

Directive that application of such unit prices to quantities of Work proposed will cause substantial inequity to the Owner or Contractor, the applicable unit prices shall be equitably adjusted.

7.2 Change Orders

7.2.1 A Change Order is a written instrument prepared by the Architect and signed by the Owner *and* Contractor \ stating their agreement upon all of the following:

.1 a change in the Work;

.2 the amount of the adjustment in the Contract Sum, if any; and

.3 the extent of the adjustment in the Contract Time, if any.

7.2.2 Methods used in determining adjustments to the Contract Sum may include those listed in Subparagraph 7.3.3.

7.3 Construction Change Directives

7.3.1 A Construction Change Directive is a written order prepared by the Architect and signed by the Owner, \ directing a change in the Work and stating a proposed basis for adjustment, if any, in the Contract Sum or Contract Time, or both. The Owner may by Construction Change Directive, without invalidating the Contract, order changes in the Work within the general scope of the Contract consisting of additions, deletions or other revisions, the Contract Sum and Contract Time being adjusted accordingly.

7.3.2 A Construction Change Directive shall be used in the absence of total agreement on the terms of a Change Order.

7.3.3 If the construction Change Directive provides for an adjustment to the Contract Sum, the adjustment shall be based on one of the following methods:

.1 mutual acceptance of a lump sum properly itemized and supported by sufficient substantiating data to permit evaluation;

.2 unit prices stated in the contract Documents or subsequently agreed upon;

.3 cost to be determined in a manner agreed upon by the parties and a mutually acceptable fixed or percentage fee; or

.4 as provided in Subparagraph 7.3.6.

7.3.4 Upon receipt of a Construction Change Directive, the Contractor shall promptly proceed with the change in the Work involved and advise the Architect of the Contractor's agreement or disagreement with the method, if any, provided in the Construction Change Directive for determining the proposed adjustment in the Contract Sum or Contract Time.

7.3.5 A Construction Change Directive signed by the Contractor indicates the agreement of the Contractor therewith, including adjustment in Contract Sum and Contract Time or the method for determining them. Such agreement shall be effective immediately and shall be recorded as a Change Order.

7.3.6 If the Contractor does not respond promptly or disagrees with the method for adjustment in the Contract Sum, the method and the adjustment shall be determined by the Architect on the basis of reasonable expenditures and savings of those performing the Work attributable to the change, including, in case of an increase in the Contract Sum, a reasonable allowance for overhead and profit. In such case, and also under Clause 7.3.3.3, the Contractor shall keep and present, in such form as the Architect may prescribe, an itemized accounting together with appropriate supporting data. Unless otherwise provided in the Contract Documents, costs for the purposes of this Subparagraph 7.3.6 shall be limited to the following:

.1 costs of labor, including social security, old age and unemployment insurance, fringe benefits required by agreement or custom, and workers' or workmen's compensation insurance;

.2 costs of materials, supplies and equipment, including cost of transportation, whether incorporated or consumed;

.3 rental costs of machinery and equipment, exclusive of hand tools, whether rented from the Contractor or others;

.4 costs of premiums for all bonds and insurance, permit fees, and sales, use or similar taxes related to the Work; and

.5 additional costs of supervision and field office personnel directly attributable to the change.

7.3.7 Pending final determination of cost to the Owner, amounts not in dispute may be included in Applications for Payment. The amount of credit to be allowed by the Contractor to the Owner for a deletion or change which results in a net decrease in the Contract Sum shall be actual net cost as confirmed by the Architect. When both additions and credits covering related Work or substitutions are involved in a change, the allowance for overhead and profit shall be figured on the basis of net increase, if any, with respect to that change.

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7.4 Minor Changes In The Work

7.4.1 The Architect will have authority to order minor changes in the Work not involving adjustment in the Contract Sum or extension of the Contract Time and not inconsistent with the intent of the Contract Documents. Such changes shall be effected by written order and shall be binding on the Owner and Contractor. The Contractor shall carry out such written orders promptly.

7.5 Change Order Requests

***7.5.1** The Owner may propose Changes in the Work by issuing supplementary instructions to the Contractor describing the Change and requesting from the Contractor the submission of a Change Order Request. Where time does not permit the processing of a Change Order prior to commencing the Work, the Contractor shall, upon written order from the Owner, proceed with the Work while concurrently proceeding with preparation and submission of a Change Order Request.*

***7.5.2** Within five days of receipt of supplemental instructions or a written order to proceed with a Change in the Work the Contractor shall provide to the Owner and Architect a preliminary estimate of any change in Contract Sum or Contract Time for such Change in the Work. In no more than fifteen days thereafter, the Contractor shall submit a Change Order Request to the Owner and Architect indicating the requested adjustment in Contract Sum and Contract Time, if any, justified with an itemization of all costs of labor, materials, supplies, equipment and reasonable overhead and profit. Any request for an extension of time shall be justified by reference to the then current construction schedule. If no Change Order Request is submitted by the Contractor within twenty days of initial Owner request for same, it shall be conclusively presumed that the Change proposed in the supplementary instructions to the Contractor will not result in an increase in the Contract Sum or in the Contract Time and that the Contractor will perform the Work without any such increase. If Contractor is unable to submit the above information within the specified time limit it shall notify the Owner and Architect in writing, setting forth for the Owner's approval a date by which it will submit the information as well as a schedule for the performance of the Change in the Work.*

7.5.3 Upon the Owner's acceptance of a Change Order Request, the Architect shall prepare a Change Order for execution by the Owner and Contractor adjusting the Contract Sum and Contract Time.

7.5.4 In the event that the Owner and Contractor do not agree on an adjustment in Contract Sum or Contract Time, the Owner may nevertheless issue a Directive ordering that the change proceed pending such an agreement, and that the adjustment in Contract Sum shall be based on an accounting of reasonable expenditures or savings on labor, materials and equipment as well as reasonable overhead and profit, and the Contractor shall promptly proceed with the Changes in the Work.

7.5.5 No Change in the Work shall be the basis of an addition to the Contract Sum or a change in the Contract Time unless such Change has been authorized by a Change Order executed in accordance with the Contract Documents. Changes in the Work may be made without notice to Contractor's sureties and absence of such notice shall not relieve such sureties of any of their obligations to the Owner.

Article 8
TIME

8.1 Definitions

8.1.1 Unless otherwise provided, Contract Time is the period of time, including authorized adjustments, allotted in the Contract Documents for Substantial Completion of the Work.

8.1.2 The date of commencement of the Work is the date established in the Agreement. The date shall not be postponed by the failure to act of the Contractor or of persons or entities for whom the Contractor is responsible.

8.1.3 The date of Substantial Completion \ *shall be as defined in* Paragraph 9.8.

8.1.4 The term "day" as used in the Contract Documents shall mean calendar day unless otherwise specifically defined.

8.2 Progress And Completion

8.2.1 Time limits stated in the Contract Documents are of the essence of the Contract. By executing the Agreement the Contractor confirms that the Contract Time is a reasonable period for performing the Work.

8.2.2 The Contractor shall not knowingly, except by agreement or instruction of the Owner in writing, prematurely commence operations on the site or elsewhere prior to the effective date of insurance required by Article 11, *the Bidding Requirements and the Contract Documents*, to be furnished by the Contractor. The date of commencement of the Work shall not be changed by the effective date of such insurance. Unless the date of commencement is established by a notice to proceed given by the Owner, the Contractor shall notify the Owner in writing not less than five days or other agreed period before commencing the Work to permit the timely filing of mortgages, mechanic's liens and other security interests.

8.2.3 The Contractor shall proceed expeditiously with adequate forces and shall achieve Substantial Completion within the Contract Time.

8.3 Delays And Extensions Of Time

8.3.1 If the Contractor is delayed at any time in progress of the Work by an act or neglect of the Owner or Architect, or of an employee of either, *or of a separate contractor employed by the Owner*, or by changes ordered in the Work, or by labor disputes, fire, unusual delay in deliveries, unavoidable casualties or other causes beyond the Contractor's control, or by delay authorized by the Owner \ then the Contract Time shall be extended by Change Order for such reasonable time as \ may *be* determined. *A time extension shall be Contractor's sole remedy and there shall be no compensation for any such delays other than those resulting from the active interference of the Architect, Owner or their employees or agents.*

8.3.2 Claims relating to time shall be made in accordance with applicable provisions of Paragraph 4.3.

8.3.3 This Paragraph 8.3 does not preclude recovery of damages for delay by either party under other provisions of the Contract Documents.

Article 9
PAYMENTS AND COMPLETION

9.1 Contract Sum

9.1.1 The Contract Sum is stated in the Agreement and, including authorized adjustments, is the total amount payable by the Owner to the Contractor for performance of the Work under the Contract Documents.

9.2 Schedule Of Values

9.2.1 *If a Schedule of Values is not appended to the Owner Contractor Agreement, then* before the first Application for Payment, the Contractor shall submit to the Architect *and Owner* a schedule of values allocated to various portions of the Work, prepared in such form and supported by such data to substantiate its accuracy as the Architect may require. This schedule, unless objected to by the Architect *or Owner*, shall be used as a basis for reviewing the Contractor's Applications for Payment.

9.3 Applications For Payment

9.3.1 At least ten days before the date established for each progress payment, the Contractor shall submit to the Architect an itemized Application for Payment for operations completed in accordance with the schedule of values. Such application shall be notarized, \ and supported by such data substantiating the Contractor's right to payment as the Owner or Architect may require, such as copies of requisitions from Subcontractors and material suppliers, *lien waivers and releases*, and reflecting retainage \ provided for elsewhere in the Contract Documents.

9.3.1.1 Such applications may include requests for payment on account of changes in the Work which have been properly authorized by Construction Change Directives but not yet included in Change Orders.

9.3.1.2 Such applications may not include requests for payment of amounts the Contractor does not intend to pay to a Subcontractor or material supplier because of a dispute or other reason.

9.3.2 Unless otherwise provided in the Contract Documents, payments shall be made on account of materials and equipment delivered and suitably stored at the site for subsequent incorporation in the Work. If approved in advance by the Owner, payment may similarly be made for materials and equipment suitably stored off the site at a location agreed upon in writing. Payment for materials and equipment stored on or off the site shall be conditioned upon compliance by the Contractor with procedures satisfactory to the Owner to establish the Owner's title to such materials and equipment or otherwise protect the Owner's interest, and shall include applicable insurance, storage and transportation to the site for such materials and equipment stored off the site.

9.3.3 The Contractor warrants that title to all Work covered by an Application for Payment will pass to the Owner no later than the time of payment. The Contractor further warrants that upon submittal of an Application for Payment all Work for which Certificates for Payment have been previously issued and payments received from the Owner shall, \ be free and clear of liens, claims, security interests or encumbrances in favor of the Contractor, Subcontractors, material suppliers, or other persons or entities making a claim by reason of having provided labor, materials and equipment relating to the Work.

9.4 Certificates For Payment

9.4.1 The Architect will, within seven days after receipt of the Contractor's Application for Payment, either issue to the Owner a Certificate for Payment, with a copy to the Contractor, for such amount as the Architect *recommends* is properly due, or notify the Contractor and Owner in writing of the Architect's reasons for withholding certification in whole or in part as provided in Subparagraph 9.5.1.

9.4.2 The issuance of *Architect's* Certificate for Payment will constitute a representation \ to the Owner, based on the Architect's observations at the site *as provided in Subparagraph 4.2.2* and the data comprising the *Contractor's* Application for Payment, that the Work has progressed to the point indicated and that, to the best of the Architect's knowledge, information and belief, the quality of the Work is in accordance with the Contract Documents. The foregoing representations are subject \ *a review* of the Work for *general* conformance with the Contract Documents upon Substantial Completion, to results of subsequent tests and inspections, to minor deviations from the Contract Documents correctable prior to completion and to specific qualifications expressed by the Architect. \ However, the issuance of a Certificate for Payment will not be a representation that the Work is without defects or that the Architect has (1) made exhaustive or continuous on-site inspections to check the quality or quantity of the Work, (2) reviewed construction means, methods, techniques, schedules, sequences or procedures *or other items set forth in Subparagraph 4.2.3*, (3) reviewed copies of requisitions received from Subcontractors and material suppliers and other data requested by the Owner to substantiate the Contractor's right to payment or (4) ascertained how or for what purpose the Contractor has used money previously paid on account of the Contract Sum. *Further, the Architect shall not be obligated to issue any Certificate for Payment covering work by Design/Build contractors or subcontractors, work by Owner's separate contractors, or other work for which the Architect is not providing full services.*

9.5 Decisions To Withhold Certification

9.5.1 The Architect may \ withhold a Certificate for Payment in whole or in part, to the extent reasonably necessary to protect the Owner, if in the Architect's opinion the representations to the Owner required by Subparagraph 9.4.2 cannot be made. If the Architect is unable to certify payment in the amount of the Application, the Architect will notify the Contractor and Owner as provided in Subparagraph 9.4.1. If the Contractor and Architect cannot agree on a revised amount, the Architect will promptly issue a Certificate for Payment for the amount for which the Architect is able to make such representations to the Owner. The Architect \ because of subsequently discovered evidence or subsequent observations, may nullify the whole or a part of a Certificate for Payment previously issued, to such extent as may be necessary in the Architect's opinion to protect the Owner from loss because of:

.1 defective Work not remedied;

.2 third party claims filed or reasonable evidence indicating probable filing of such claims;

.3 failure of the Contractor to make payments properly to Subcontractors or for labor, materials or equipment;

.4 reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Sum;

.5 damage to the Owner or another contractor;

.6 reasonable evidence that the Work will not be completed within the Contract Time, and that the unpaid balance would not be adequate to cover actual or liquidated damages for the anticipated delay;

.7 \ failure to carry out the Work in accordance with the Contract Documents; *or*

.8 *rejection or non-acceptance of any Work by any governmental agency having jurisdiction.*

9.5.2 When the above reasons for withholding certification are removed, certification will be made for amounts previously withheld.

9.6 Progress Payments

9.6.1 After the Architect has issued a Certificate for Payment, the Owner shall make payment in the manner and within the time provided in the Contract Documents, and shall so notify the Architect. *Payments may be made by check jointly payable to the Contractor, its Subcontractor or supplier and any applicable labor union trust fund.*

9.6.2 The Contractor shall promptly pay each Subcontractor, upon *receipt of payment from the Owner, out of the amount paid to the* Contractor on account of such Subcontractor's portion of the Work, the amount to which said Subcontractor is entitled, reflecting percentages actually retained from payments to the Contractor on account of such Subcontractor's portion of the Work. The Contractor shall, by appropriate agreement with each Subcontractor, require each Subcontractor to make payments to Sub-subcontractors in similar manner.

9.6.3 The Architect *or Owner may*, on request, furnish to a Subcontractor, if practicable, information regarding percentages of completion or amounts applied for by the Contractor and action taken thereon by the Architect and Owner on account of portions of the Work done by such Subcontractor.

9.6.4 Neither the Owner nor Architect shall have an obligation to pay or to see to the payment of money to a Subcontractor except as may otherwise be required by law.

9.6.5 Payment to material suppliers shall be treated in a manner similar to that provided in Subparagraphs 9.6.2, 9.6.3 and 9.6.4.

9.6.6 A Certificate for Payment, a progress payment, or partial or entire use or occupancy of the Project by the Owner shall not constitute acceptance of Work not in accordance with the Contract Documents.

9.7 Failure Of Payment

9.7.1 If the Architect does not issue a Certificate for Payment, through no fault of the Contractor, within seven days after receipt of the Contractor's Application for Payment, or if the Owner does not pay the Contractor within seven days after the date established in the Contract Documents the amount certified by the Architect or awarded by \ *a court or forum of competent jurisdiction*, then the Contractor may, upon seven additional days' written notice to the Owner and Architect, stop the Work until payment of the amount owing has been received. The Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable costs of shut-down, delay and startup, which shall be accomplished as provided in Article 7.

9.8 Substantial Completion

9.8.1 Substantial Completion is the stage in the progress of the Work when the Work or designated portion thereof is sufficiently complete in accordance with the Contract Documents *and all required final inspections and permits have been obtained* so the Owner can occupy or utilize the Work for its intended use, *subject only to completion of minor punchlist items.*

9.8.2 When the Contractor considers that the Work, or a portion thereof which the Owner agrees to accept separately, is substantially complete, the Contractor shall prepare and submit to the Architect a comprehensive list *(punchlist)* of items to be completed or corrected. The Contractor shall proceed promptly to complete and correct items on the list. Failure to include an item on such list does not alter the

responsibility of the Contractor to complete all Work in accordance with the Contract Documents. Upon receipt of the Contractor's list, the Architect will make *a field review* to determine whether the Work or designated portion thereof is substantially complete. If the Architect's *field review* discloses any item, whether or not included on the Contractor's list, which is not in accordance with the requirements of the Contract Documents, the Contractor shall, before issuance of the Certificate of Substantial Completion, complete or correct such item upon notification by the Architect. The Contractor shall then submit a request for another *field review* by the Architect to determine Substantial Completion. *If upon this subsequent review, the Contractor has not yet completed the Work, and further field reviews by Architect are required, Contractor shall be responsible to Owner for any additional cost to Owner of further reviews by Architect.* When the Work or designated portion thereof is substantially complete, the Architect will prepare a Certificate of Substantial Completion which shall establish the date of Substantial Completion, shall establish responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work and insurance, and shall fix the time within which the Contractor shall finish all items on the list accompanying the Certificate. Warranties required by the Contract Documents shall commence on the date of Substantial Completion of the Work or designated portion thereof unless otherwise provided in the Certificate of Substantial Completion. The Certificate of Substantial Completion shall be submitted to the Owner and Contractor for their written acceptance of responsibilities assigned to them in such Certificate. *In the absence of such certificate, the date of Substantial Completion shall be in accordance with Subparagraph 9.8.1.*

9.8.3 Upon Substantial Completion of the Work or designated portion thereof and upon application by the Contractor and *issuance of a certificate* by the Architect, the Owner shall make payment, reflecting adjustment in retainage, if any, for such Work or portion thereof as provided in the Contract Documents.

9.9 Partial Occupancy Or Use

9.9.1 The Owner may occupy or use any completed or partially completed portion of the Work at any stage when such portion is designated by separate agreement with the Contractor, provided such occupancy or use is consented to by the insurer as required under Subparagraph 11.3.11 and authorized by public authorities having jurisdiction over the Work. Such partial occupancy or use may commence whether or not the portion is substantially complete, provided the Owner and Contractor have accepted in writing the responsibilities assigned to each of them for payments, retainage if any, security, maintenance, heat, utilities, damage to the Work and insurance, and have agreed in writing concerning the period for correction of the Work and commencement of warranties required by the Contract Documents. When the Contractor considers a portion substantially complete, the Contractor shall prepare and submit a list to the Architect as provided under Subparagraph 9.8.2. Consent of the Contractor to partial occupancy or use shall not be unreasonably withheld. The stage of the progress of the Work shall be determined by written agreement between the Owner and Contractor \.

9.9.2 Immediately prior to such partial occupancy or use, the Owner, Contractor and Architect shall jointly inspect the area to be occupied or portion of the Work to be used in order to determine and record the condition of the Work.

9.9.3 Unless otherwise agreed upon, partial occupancy or use of a portion or portions of the Work shall not constitute acceptance of Work not complying with the requirements of the Contract Documents, *nor shall it start the guarantee or warranty period.*

9.10 Final Completion And Final Payment

9.10.1 Upon receipt of written notice that the Work is ready for *final field review* and acceptance and upon receipt of a final Application for Payment, the Architect will promptly make such *field review* and, when the Architect finds the Work acceptable under the Contract Documents and the Contract fully performed, the Architect will promptly issue a final Certificate for Payment stating that to the best of the Architect's knowledge, information and belief, and on the basis of the Architect's observations and *field reviews*, the Work has been completed in accordance with terms and conditions of the Contract Documents and that the entire balance found to be due the Contractor and noted in said final Certificate is due and payable. \

9.10.2 Neither final payment nor any remaining retained percentage shall become due until the Contractor submits to the Architect *and Owner* (1) an affidavit that payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the Owner or the Owner's property might be responsible or encumbered (less amounts withheld by Owner) have been paid or otherwise satisfied, (2) a certificate evidencing that insurance required by the Contract Documents to remain in force after final payment, is currently in effect and will not be canceled or allowed to expire until at least 30 days' prior written notice has been given to the Owner, (3) a written statement that the Contractor knows of no substantial reason that the insurance will not be renewable to cover the period required by the Contract Documents, (4) consent of surety, if any, to final payment and (5), if required by the Owner, other data establishing payment or satisfaction of obligations, such as receipts, releases and waivers of liens, claims, security interests or encumbrances arising out of the Contract, to the extent and in such form as may be designated by the Owner. If a Subcontractor refuses to furnish a release or waiver required by the Owner, the Contractor may furnish a bond satisfactory to the Owner to indemnify the Owner against such lien. If such lien remains unsatisfied after payments are made, the Contractor shall refund to the Owner all money that the Owner may be compelled to pay in discharging such lien, including all costs and reasonable attorneys' fees.

9.10.3 If, after Substantial Completion of the Work, final completion thereof is materially delayed through no fault of the Contractor or by issuance of Change Orders affecting final completion, \ the Owner shall, upon application by the Contractor and certification by the Architect, and *without terminating the Contract, make payment of the balance due for* that portion of the Work fully completed and accepted. If the remaining balance for Work not fully completed or corrected is less than retainage stipulated in the Contract Documents, and if bonds have been furnished, the written consent of surety to payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by the Contractor to the Architect prior to certification of such payment. Such payment shall be made under terms and conditions governing final payment, except that it shall not constitute a waiver of claims. The making of final payment shall constitute a waiver of claims by the Owner as provided in Subparagraph *4.3.5. Notwithstanding the foregoing, In no event shall the retainage attributable to any unfinished Work be less than 150% of the cost to complete the Work as estimated by the Architect.*

9.10.4 Acceptance of final payment by the Contractor, a Subcontractor or material supplier shall constitute a waiver of claims by that payee except those previously made in writing and identified by that payee as unsettled at the time of final Application for Payment. Such waivers shall be in addition to the waiver described in Subparagraph 4.3.5.

Article 10
PROTECTION OF PERSONS AND PROPERTY

10.1 Safety Precautions And Programs

10.1.1 The Contractor shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the performance of the Contract.

10.1.2 *Unless the Agreement specifically provides otherwise,* in the event the Contractor *at any time* encounters on the site material reasonably believed to be asbestos, polychlorinated biphenyl (PCB), *lead-based paints or any other potentially toxic or hazardous contaminants, materials, pollutants which for the purpose of this Article 10 means solid, liquid, gaseous, or thermal irritant or contaminant,*

including smoke, vapor, soot, fumes, acids, alkalis, chemicals and wastes ("Hazardous Substance"), \ :

.1 *If the Hazardous Substance is not incident to Work on the site,* the Contractor shall immediately stop Work in the area affected and report the condition to the Owner \ in writing. The Work in the affected area shall not thereafter be resumed except by written agreement of the Owner and Contractor if in fact the material is asbestos or polychlorinated biphenyl (PCB) *or other hazardous substance* and has not been rendered harmless. The Work in the affected area shall be resumed in the absence of \ *Hazardous Substance,* or when it has been rendered harmless.

.2 *If the Hazardous Substance is introduced incident to the Work, the Contractor shall immediately notify the Owner in writing and reach an understanding with the Owner as to how the Contractor will, at its expense, take action as required to contain and remove or render harmless the Hazardous Substance. The Contractor shall promptly report the progress and all actions taken to the Owner in writing.*

10.1.3 *Prior to commencement of the Work, the Contractor shall require manufacturers of all materials and equipment for the Work to provide certifications, warranties or statements that such materials or equipment (1) are free of injurious amounts of Hazardous Substances or (2) contains specific amounts of Hazardous Substances and recommendations regarding handling of such. Such certifications, warranties or statements shall be in writing in a form acceptable to the Owner, and shall be forwarded by the Contractor to the Owner. If the manufacturer states that a material or equipment contains injurious amounts of Hazardous Substances, the Owner shall be afforded adequate and timely opportunity to order that other materials be substituted without causing delay to the Project.*

The Contractor agrees to indemnify, defend and hold the Owner, Architect and their agents, employees, principals, officers, shareholders, directors, and consultants, if any, (for the purpose of this Subparagraph 10.1.3, individually and collectively "Indemnitee(s)" respectively) harmless from and against any and all claims, liabilities, suits, demands, losses, costs and expenses, including, but not limited to, reasonable attorneys' fees and all legal expenses and fees incurred through appeal, and all interest thereon, accruing to or resulting from any and all persons, firms or any other legal entities, on account of any damages or losses to property or persons, , but not limited to, death or economic losses, arising out of or resulting from portions of the Work which contain, utilize, generate, or emit injurious amounts of Hazardous Substances or Hazardous Substances not rendered harmless, whenever occurring, except that the Contractor shall have no duty to indemnify an Indemnitee that is found to be solely liable as between the parties hereto as well as between any other persons, firms or any other legal entities for such damages or losses by a court or forum of competent jurisdiction.

10.1.4 The Owner shall indemnify *defend* and hold the Contractor, Architect, and *their* agents, employees, *principals, officers, shareholders, directors, and consultants, if any, (for the purpose of this Subparagraph 10.1.4, individually and collectively "Indemnitee(s)" respectively) harmless* from and against *any and all* claims, *liabilities, suits, demands,* losses *costs* and expenses, including but not limited to *reasonable* attorneys' fees, *and all legal expenses and fees incurred through appeal, and all interest thereon, accruing to or resulting from any and all persons, firms or any other legal entities, on account of any damages or losses to property or persons, including, but not limited to, death or economic losses,* arising out of or resulting from performance of the Work in the affected area if in fact *there* exists asbestos or polychlorinated biphenyl (PCB) or *other Hazardous Substances* \ *that have* not been rendered harmless \ . Such obligation shall not be construed to negate, abridge, or reduce other rights or obligations of indemnity which would otherwise exist as to a party or person described in this Subparagraph 10.1.4.

10.2 Safety Of Persons And Property

10.2.1 The Contractor shall take reasonable precautions for safety of, and shall provide reasonable protection to prevent damage, injury or loss to:

.1 employees on the Work and other persons who may be affected thereby;

.2 the Work and materials and equipment to be incorporated therein, whether in storage on or off the site, under care, custody or control of the Contractor or the Contractor's Subcontractors or Sub- subcontractors;

.3 other property at the site or adjacent thereto, such as trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation or replacement in the course of construction; *and*

.4 *the completed Work within or adjacent to existing facilities including furnishings, equipment and personal property.*

10.2.2 The Contractor shall give notices and comply with applicable laws, ordinances, rules, regulations and lawful orders of public authorities bearing on safety of persons or property or their protection from damage, injury or loss.

10.2.3 The Contractor shall erect and maintain, as required by existing conditions and performance of the Contract, reasonable safeguards for safety and protection, including posting danger signs and other warnings against hazards, promulgating safety regulations and notifying owners and users of adjacent sites and utilities.

10.2.4 When use or storage of explosives or other Hazardous Substances or equipment or unusual methods are necessary for execution of the Work, the Contractor shall exercise utmost care and carry on such activities under supervision of properly qualified personnel.

10.2.5 The Contractor shall promptly remedy damage and loss (other than damage or loss insured under property insurance required by the Contract Documents) to property referred to in Clauses 10.2.1.2, 10.2.1.3 *and 10.2.1.4* caused in whole or in part by the Contractor, a Subcontractor, a Sub-subcontractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts they may be liable and for which the Contractor is responsible, \ except damage or loss attributable to acts or omissions of the Owner or Architect or anyone directly or indirectly employed by either of them, or by anyone for whose acts either of them may be liable, and not attributable to the fault or negligence of the Contractor. The foregoing obligations of the Contractor are in addition to the Contractor's obligations under Paragraph 3.18.

10.2.6 The Contractor shall designate a responsible member of the Contractor's organization at the site whose duty shall be the prevention of accidents. This person shall be the Contractor's superintendent unless otherwise designated by the Contractor in writing to the Owner. \

10.2.7 The Contractor shall not load or permit any part of the construction or site to be loaded so as to endanger its safety.

10.3 Emergencies

10.3.1 In an emergency affecting safety of persons or property, the Contractor shall act, at the Contractor's discretion, to prevent threatened damage, injury or loss. Additional compensation or extension of time claimed by the Contractor on account of an emergency shall be determined as provided in Paragraph 4.3 and Article 7.

Article 11
INSURANCE AND BONDS

11.1 Contractor's Liability Insurance

11.1.1 *Unless otherwise provided for in the Bidding Requirements or Contract Documents or otherwise agreed to in writing by Owner and Contractor, the* Contractor shall purchase from and maintain in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located such insurance as will protect the Contractor from claims set forth below which may arise out of or result from the Contractor's operations under the Contract and for which the Contractor may be legally liable, whether such operations be by the Contractor or by a Subcontractor or by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable: *Such policies, except workmen's compensation, shall be endorsed to name the Owner and Architect as additional insureds.*

.1 claims under workers' or workmen's compensation, disability benefit and other similar employee benefit acts which are applicable to the Work to be performed;

.2 claims for damages because of bodily injury, occupational sickness or disease, or death of the Contractor's employees;

.3 claims for damages because of bodily injury, sickness or disease, or death of any person other than the Contractor's employees;

.4 claims for damages insured by usual personal injury liability coverage which are sustained (1) by a person as a result of an offense directly or indirectly related to employment of such person by the Contractor, or (2) by another person;

.5 claims for damages, other than to the Work itself, because of injury to or destruction of tangible property, including loss of use resulting therefrom;

.6 claims for damages because of bodily injury, death of a person or property damage arising out of ownership, maintenance or use of a motor vehicle; and

.7 claims involving contractual liability insurance applicable to the Contractor's obligations under Paragraph 3.18.

11.1.2 The insurance required by Subparagraph 11.1.1 shall be written for not less than limits of liability specified in the *Bidding Requirements*, Contract Documents or required by law, whichever coverage is greater. Coverages, whether written on an occurrence or claims-made basis, shall be maintained without interruption from date of commencement of the Work until date of final payment and termination of any coverage required to be maintained after final payment.

11.1.3 *Copies of policies or* Certificates of Insurance acceptable to the Owner shall be filed with the Owner prior to commencement of the Work. These Certificates and the insurance policies required by this Paragraph 11.1 shall contain a provision that coverages afforded under the policies will not be *modified*, canceled or allowed to expire until at least 30 days' prior written notice has been given to the Owner. If any of the foregoing insurance coverages are required to remain in force after final payment and are reasonably available, an additional certificate evidencing continuation of such coverage shall be submitted with the final Application for Payment as required by Subparagraph 9.10.2. Information concerning reduction of coverage shall be furnished by the Contractor with reasonable promptness. \

***11.1.4** If Contractor fails to secure and maintain the required insurance, Owner shall have the right (but not the obligation) to secure same in the name and for the account of Contractor, in which event Contractor shall pay the cost thereof and shall furnish upon demand all information that may be required in connection therewith.*

11.2 Owner's Liability Insurance

11.2.1 The Owner shall be responsible for purchasing and maintaining the Owner's usual liability insurance. Optionally, the Owner may purchase and maintain other insurance for self protection against claims which may arise from operations under the Contract. The Contractor shall not be responsible for purchasing and maintaining this optional Owner's liability insurance unless specifically required by the *Bidding Requirements or* Contract Documents.

11.3 Property Insurance

11.3.1 Unless otherwise \ *required in the Bidding Requirements, or in the Owner/Contractor Agreement, Supplementary Conditions, or Special Conditions,* the Owner shall purchase and maintain, in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located, property insurance in the amount of the initial Contract Sum as well as subsequent modifications thereto for the entire Work at the site on a replacement cost basis without voluntary deductibles. Such property insurance shall be maintained, unless otherwise provided in the Contract Documents or otherwise agreed in writing by all persons and entities who are beneficiaries of such insurance, until final payment has been made as provided in Paragraph 9.10 or until no person or entity other than the Owner has an insurable interest in the property required by this Paragraph 11.3 to be covered, whichever is earlier. This insurance shall include interests of the Owner, the Contractor, shall pay costs not covered because of such deductibles. If the Owner or insurer increases the required minimum deductibles above the amounts so identified or if the Owner elects to purchase this insurance with voluntary deductible amounts, the Owner shall be responsible for payment of the additional costs not covered because of such increased or voluntary deductibles. If deductibles are not identified in the Contract Documents, the Owner shall pay costs not covered because of deductibles.

11.3.1.4 Unless otherwise provided in the *Bidding Requirements* or Contract Documents, this property insurance shall cover portions of the Work stored off the site after written approval of the Owner at the value established in the approval, and also portions of the Work in transit. *It shall not, however, cover Contractor's equipment, machinery or tools.*

11.3.2 Boiler and Machinery Insurance: The Owner shall purchase and maintain boiler and machinery insurance required by the *Bidding Requirements or* Contract Documents or by law, which shall specifically cover such insured objects during installation and until final acceptance by the Owner; this insurance shall include interests of the

Owner, Contractor, Subcontractors and Sub-subcontractors in the Work, and the Owner and Contractor shall be named insureds.

11.3.3 Loss of Use Insurance: The Owner, at the Owner's option, may purchase and maintain such insurance as will insure the Owner against loss of use of the Owner's property due to fire or other hazards, however caused. The Owner waives all rights of action against the Contractor for loss of use of the Owner's property, including consequential losses due to fire or other hazards however caused, *to the extent Owner's insurance covers such losses.*

11.3.4 If the Contractor requests in writing that insurance for risks other than those described herein or for other special hazards be included in the property insurance policy, the Owner shall, if possible, include such insurance, and the cost thereof shall be charged to the Contractor by appropriate Change Order.

11.3.5 If during the Project construction period the Owner insures properties, real or personal or both, adjoining or adjacent to the site by property insurance under policies separate from those insuring the Project, or if after final payment property insurance is to be provided on the completed Project through a policy or policies other than those insuring the Project during the construction period, *if permitted by insurer, and to the extent covered for any losses*, the Owner shall waive all rights in accordance with the terms of Subparagraph 11.3.7 for damages caused by fire or other perils covered by this separate property insurance. All separate policies shall provide this waiver of subrogation by endorsement or otherwise.

11.3.6 Before an exposure to loss may occur, the Owner shall file with the Contractor a *certificate of insurance or* copy of each policy that includes insurance coverages required by this Paragraph 11.3. Each policy *or certificate* shall contain all generally applicable conditions, definitions, exclusions and endorsements related to this Project. Each policy shall contain a provision that the policy will not be canceled or allowed to expire until at least 30 days' prior written notice has been given to the Contractor.

11.3.7 Waivers of Subrogation: The Owner and Contractor waive all rights against (1) each other and any of their subcontractors, sub-subcontractors, agents and employees, each of the other, and (2) the Architect, Architect's consultants, separate contractors described in Article 6, if any, and any of their subcontractors, sub-subcontractors, agents and employees, for damages caused by fire or other perils to the extent covered by property insurance obtained pursuant to this Paragraph 11.3 or other property insurance applicable to the Work, except such rights as they have to proceeds of such insurance held by the Owner as fiduciary. The Owner or Contractor, as appropriate, shall require of the Architect, Architect's consultants, separate contractors described in Article 6, if any, and the subcontractors, sub-subcontractors, agents and employees of any of them, by appropriate agreements, written where legally required for validity, similar waivers each in favor of other parties enumerated herein. The policies shall provide such waivers of subrogation by endorsement or otherwise. A waiver of subrogation shall be effective as to a person or entity even though that person or entity would otherwise have a duty of indemnification, contractual or otherwise, did not pay the insurance premium directly or indirectly, and whether or not the person or entity had an insurable interest in the property damaged.

11.3.8 A loss insured under Owner's property insurance shall be adjusted by the Owner as fiduciary and made payable to the Owner as fiduciary for the insureds, as their interests may appear, subject to requirements of any applicable mortgagee clause and of Subparagraph 11.3.10. The Contractor shall pay Subcontractors their just shares of insurance proceeds received by the Contractor, and by appropriate agreements, written where legally required for validity, shall require Subcontractors to make payments to their Sub-subcontractors in similar manner.

11.3.9 If required in writing by a party in interest, the Owner as fiduciary shall, upon occurrence of an insured loss, give bond for proper performance of the Owner's duties. The cost of required bonds shall be charged against proceeds received as fiduciary. The Owner shall deposit in a separate account proceeds so received, which the Owner shall distribute in accordance with such agreement as the parties in interest may reach, or in accordance with \ *a legal judgment or* award \ . If after such loss no other special agreement is made, replacement of damaged property shall be covered by appropriate Change Order *or Change Directive.*

11.3.10 The Owner as fiduciary shall have power to adjust and settle a loss with insurers\ .

11.3.11 Partial occupancy or use in accordance with Paragraph 9.9 shall not commence until the insurance company or companies providing property insurance have consented to such partial occupancy or use by endorsement or otherwise. The Owner and the Contractor shall take reasonable steps to obtain consent of the insurance company or companies and shall, without mutual written consent, take no action with respect to partial occupancy or use that would cause cancellation, lapse or reduction of insurance.

11.4 Performance Bond And Payment Bond

11.4.1 The Owner shall have the right to require the Contractor to furnish bonds covering faithful performance of the Contract and payment of obligations arising thereunder as stipulated in bidding requirements or specifically required in the Contract Documents on the date of execution of the Contract.

11.4.2 Upon the request of any person or entity appearing to be a potential beneficiary of bonds covering payment of obligations arising under the Contract, the Contractor shall promptly furnish a copy of the bonds or shall permit a copy to be made.

Article 12
UNCOVERING AND CORRECTION OF WORK

12.1 Uncovering Of Work

12.1.1 If a portion of the Work is covered contrary to the Architect's request or to requirements specifically expressed in the Contract Documents, *or to requirements of any public authority having jurisdiction over the Work*, it must, if required in writing by the Architect *or Owner*, be uncovered for the Architect's *or Owner's or public authority's* observation and be replaced at the Contractor's expense *and* without change in the Contract Time.

12.1.2 If a portion of the Work has been covered which the Architect *or its Consultants have* not specifically requested to observe prior to its being covered, *or which any public authority requires being* observed or inspected prior to covering, the Architect *or Owner* may request to see such Work and it shall be uncovered by the Contractor. If such Work is in accordance with the Contract Documents, costs of uncovering and replacement shall, by appropriate Change Order, be charged to the Owner. If such Work is not in accordance with the Contract Documents, the Contractor shall pay such costs unless the condition was caused by the Owner or a separate contractor in which event the Owner shall be responsible for payment of such costs.

12.2 Correction Of Work

12.2.1 The Contractor shall promptly correct *defective* Work \ or *Work* failing to conform to the requirements of the Contract Documents, whether observed before or after Substantial Completion and whether or not fabricated, installed or completed. The Contractor shall bear costs of correcting such \ Work, including additional testing and inspections and compensation for the Architect's services and expenses made necessary thereby.

12.2.2 If, within one year after the date of Substantial Completion of the Work or designated portion thereof, or after the date for commencement of warranties established under Subparagraph 9.9.1, or by terms of an applicable special warranty required by the Contract Documents, any of the Work is found to be not in accordance with the requirements of the Contract Documents, the Contractor shall correct it promptly after receipt of written notice from the Owner to do so unless the Owner has previously given the Contractor a written acceptance of such condition. This period of one year shall be extended with respect to portions of Work first performed after Substantial Completion by the period of time between Substantial Completion and the actual performance of the Work. This obligation under this Subparagraph 12.2.2 shall survive acceptance of the Work under the Contract and termination of the Contract. The Owner shall give such notice promptly after discovery of the condition.

12.2.3 The Contractor shall remove from the site portions of the Work which are not in accordance with the requirements of the Contract Documents and are neither corrected by the Contractor nor accepted by the Owner.

12.2.4 If the Contractor fails to *proceed with the correction of* nonconforming Work within \ *seven days of notice by Owner or Architect, and thereafter fails to diligently continue such correction until completed,* the Owner may correct it in accordance with Paragraph 2.4. If the Contractor does not proceed with correction of such nonconforming Work within \ *the time period set forth herein,* the Owner may remove it and store the salvable materials or equipment at the Contractor's expense. If the Contractor does not pay costs of such removal and storage within ten days after written notice, the Owner may upon ten additional days' written notice sell such materials and equipment at auction or at private sale and shall account for the proceeds thereof, after deducting costs and damages that should have been borne by the Contractor, including compensation for the Architect's *and Owner's* services and expenses made necessary thereby. If such proceeds of sale do not cover costs which the Contractor should have borne, the Contract Sum shall be reduced by the deficiency. If payments then or thereafter due the Contractor are not sufficient to cover such amount, the Contractor shall pay the difference to the Owner.

12.2.5 The Contractor shall bear the cost of correcting destroyed or damaged construction, whether completed or partially completed, of the Owner or separate contractors caused by the Contractor's correction or removal of Work which is not in accordance with the requirements of the Contract Documents.

12.2.6 Nothing contained in this Paragraph 12.2 shall be construed to establish a period of limitation with respect to other obligations which the Contractor might have under the Contract Documents. Establishment of the time period of one year as described in Subparagraph 12.2.2 relates only to the specific obligation of the Contractor to correct the Work, and has no relationship to the time within which the obligation to comply with the Contract Documents may be sought to be enforced, nor to the time within which proceedings may be commenced to establish the Contractor's liability with respect to the Contractor's obligations other than specifically to correct the Work.

12.3 Acceptance Of Nonconforming Work

12.3.1 If the Owner prefers to accept Work which is not in accordance with the requirements of the Contract Documents, the Owner may do so instead of requiring its removal and correction, in which case the Contract Sum will be reduced as appropriate and equitable. Such adjustment shall be effected whether or not final payment has been made.

Article 13
MISCELLANEOUS PROVISIONS

13.1 Governing Law

13.1.1 The Contract shall be governed by the law of the place where the Project is located.

13.2 Successors And Assigns

13.2.1 The Owner and Contractor respectively bind themselves, their partners, successors, assigns and legal representatives to the other party hereto and to partners, successors, assigns and legal representatives of such other party in respect to covenants, agreements and obligations contained in the Contract Documents. Neither party to the Contract shall assign the Contract as a whole without written consent of the other. If either party attempts to make such an assignment without such consent, that party shall nevertheless remain legally responsible for all obligations under the Contract. *Notwithstanding the above, Owner may assign its rights and obligations hereunder to its lender, if any, and Contractor agrees, if requested, to enter into agreement with such lender pursuant to which Contractor will complete the Work in accordance with Owner Contractor Agreement and any agreed-upon modification or changes thereto.*

13.3 Written Notice

13.3.1 Written notice shall be deemed to have been duly served if delivered in person to the individual or a member of the firm or entity or to an officer of the corporation for which it was intended, or if delivered at or sent by registered or certified mail to the last business address known to the party giving notice.

13.4 Rights And Remedies

13.4.1 Duties and obligations imposed by the Contract Documents and rights and remedies available thereunder shall be in addition to and not a limitation of duties, obligations, rights and remedies otherwise imposed or available by law.

13.4.2 No action or failure to act by the Owner, Architect or Contractor shall constitute a waiver of a right or duty afforded them under the contract, nor shall such action or failure to act constitute approval of or acquiescence in a breach thereunder, except as may be specifically agreed in writing.

13.5 Tests And Inspections

13.5.1 Tests, inspections and approvals of portions of the Work required by the Contract Documents or by, laws, ordinances, rules, regulations or orders of public authorities having jurisdiction shall be made at an appropriate time. Unless otherwise provided, the Contractor shall make arrangements for such tests, inspections and approvals with an independent testing laboratory or entity acceptable to the Owner, or with the appropriate public authority, and shall bear all related costs of tests, inspections and approvals. The contractor shall give the Architect *and all other appropriate persons or agencies* timely notice of when and where tests and inspections are to be made so \ *they* may observe such procedures. The Owner shall bear costs of tests, inspections or approvals which do not become requirements until after bids are received or negotiations concluded. *Contractor shall pay for all retesting required under applicable laws and regulations.*

13.5.2 If the Architect, Owner or public authorities having jurisdiction determine that portions of the Work require additional testing, inspection or approval not included under Subparagraph 13.5.1, the Architect will, upon written authorization from the Owner, instruct the Contractor to make arrangements for such additional testing, inspection or approval by an entity acceptable to the Owner, and the Contractor shall give timely notice to the Architect *and other appropriate persons or agencies* of when and where tests and inspections are to be made so \ *they* may observe such procedures. The Owner shall bear such costs except as provided in Subparagraph 13.5.3.

13.5.3 If such procedures for testing, inspection or approval under Subparagraphs 13.5.1 and 13.5.2 reveal failure of the portions of the Work to comply with requirements established by the Contract Documents, the Contractor shall bear all costs made necessary by such failure including those of repeated procedures and compensation for the Architect's services and expenses.

13.5.4 Required certificates of testing, inspection or approval shall, unless otherwise required by the Contract Documents, be secured by the Contractor and promptly delivered to the Architect.

13.5.5 If the Architect is to observe tests, inspections or approvals required by the Contract Documents, the Architect will do so promptly and, where practicable, at the normal place of testing.

13.5.6 Tests or inspections \ shall be made promptly to avoid unreasonable delay in the Work.

13.6 Interest

13.6.1 Payments due and unpaid under the Contract Documents shall bear interest from the date payment is due at such rate as the parties may agree upon in writing or, in the absence thereof, at the legal rate prevailing from time to time at the place where the Project is located.

13.7 Commencement Of Statutory Limitation Period

13.7.1 As between the Owner and Contractor:

.1 **Before Substantial Completion:** As to acts or failures to act occurring prior to the relevant date of Substantial Completion, any applicable statute of limitations shall commence to run and any alleged cause of action shall be deemed to have accrued in any and all events not later than such date of Substantial Completion;

.2 **Between Substantial Completion and Final Certificate for Payment:** As to acts or failures to act occurring subsequent to the relevant date of Substantial Completion and prior to issuance of the final Certificate for Payment, any applicable statute of limitations shall commence to run and any alleged cause of action shall be deemed to have accrued in any and all events not later than the date of issuance of the final Certificate for Payment; and

.3 **After Final Certificate for Payment:** As to acts or failures to act occurring after the relevant date of issuance of the final Certificate for Payment, any applicable statute of limitations shall commence to run and any alleged cause of action shall be deemed to have accrued in any and all events not later than the date of any act or failure to act by the Contractor pursuant to any warranty provided under Paragraph 3.5, the date of any correction of the Work or failure to correct the Work by the Contractor under Paragraph 12.2, or the date of actual commission of any other act or failure to perform any duty or obligation by the Contractor or Owner, whichever occurs last.

Article 14
TERMINATION OR SUSPENSION OF THE CONTRACT

14.1 Termination By The Contractor

14.1.1 The Contractor may terminate the Contract if the Work is stopped for a period of 30 days *after actual commencement of construction* through no act or fault of the Contractor or a Subcontractor, Sub- subcontractor or their agents or employees or any other persons performing portions of the Work under contract with the Contractor, for any of the following reasons:

.1 issuance of an order of a court or other public authority having jurisdiction;

.2 an act of government, such as a declaration of national emergency, making material unavailable;

.3 because the Architect has not issued a Certificate for Payment and has not notified the Contractor of the reason for withholding certification as provided in Subparagraph 9.4.1, or because the Owner has not made payment on a Certificate for Payment within the time stated in the Contract Documents; *or*

.4 if repeated suspensions, delays or interruptions by the Owner as described in Paragraph 14.3 constitute in the aggregate more than 100 percent of the total number of days scheduled for completion, or 120 days in any 365-day period, whichever is less.

\

14.1.2 If one of the above reasons exists, the Contractor may, upon seven additional days' written notice to the Owner and Architect, terminate the Contract and recover from the Owner payment for Work executed and for proven loss with respect to materials, equipment, tools, and construction equipment and machinery, including reasonable overhead *and* profit \.

14.1.3 If the Work is stopped for a period of 60 days through no act or fault of the Contractor or a Subcontractor or their agents or employees or any other persons performing portions of the Work under contract with the Contractor because the Owner has persistently failed to fulfill the Owner's obligations under the Contract Documents with respect to matters important to the progress of the Work, the Contractor may, upon seven additional days' written notice to the Owner and the Architect, terminate the Contract and recover from the Owner as provided in Subparagraph 14.1.2.

14.2 Termination By The Owner For Cause

14.2.1 The Owner may terminate the Contract if the Contractor:

.1 *unreasonably* \ refuses or fails to supply enough properly skilled workers or proper materials;

.2 fails to make payment to Subcontractors for materials or labor in accordance with the respective agreements between the Contractor and the Subcontractors;

.3 \ disregards laws, ordinances, or rules, regulations or orders of a public authority having jurisdiction; or

.4 otherwise is guilty of substantial breach of a provision of the Contract Documents.

14.2.2 When any of the above reasons exist, the Owner, \ without prejudice to any other rights or remedies of the Owner and after giving the Contractor and the Contractor's surety, if any, seven days' written notice, *may* terminate employment of the Contractor and may, subject to any prior rights of the surety:

.1 take possession of the site and of all materials, equipment, tools, and construction equipment and machinery thereon owned by the Contractor;

.2 accept assignment of subcontracts pursuant to Paragraph 5.4; and

.3 finish the Work by whatever reasonable method the Owner may deem expedient.

14.2.3 When the Owner terminates the Contract for one of the reasons stated in Subparagraph 14.2.1, the Contractor shall not be entitled to receive further payment until the Work is finished.

14.2.4 If the unpaid balance of the Contract Sum exceeds *all* costs *to the Owner* of finishing the Work, including, *without limitation,* compensation for the Architect's services and expenses made necessary thereby, *other consultants, and attorneys and other legal costs,* such excess shall be paid to the Contractor. If such costs exceed the unpaid balance, the Contractor shall pay the difference to the Owner \ . This obligation for payment shall survive termination of the Contract.

14.3 Suspension By The Owner For Convenience

14.3.1 The Owner may, without cause, order the Contractor in writing to suspend, delay or interrupt the Work in whole or in part for such period of time as the Owner may determine.

14.3.2 An adjustment shall be made for *any reasonable* increases in the cost *to the Contractor* of performance of the Contract, including *a reasonable* profit on the increased cost of performance, \ *resulting from* suspension, delay or interruption in excess of thirty days. *Such increase in Contractor's profit or fee shall be calculated by multiplying the profit or fee which Contractor would otherwise earn upon completion of the Work by a fraction, the numerator of which is the increased cost of performance and the denominator of which is the Contract Sum prior to such* suspension, delay or interruption. No adjustment shall be made to the extent:

.1 that performance is, was or would have been so suspended, delayed or interrupted by another cause for which the Contractor is responsible; or

.2 that an equitable adjustment is made or denied under another provision of this Contract.

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14.4 Termination By Owner For Convenience

14.4.1 *The Owner may at any time, without notice to the sureties, terminate the employment of the Contractor for the convenience of the Owner, for any reason and without respect to whether the Contractor is then in default under the Contract Documents. In the event of such termination for convenience, and notwithstanding any other provision of the Contract Documents to the contrary, the Contractor shall receive, as its entire and sole compensation under this Agreement, its actual, necessary and reasonable Cost of the Work through the date of termination, as determined by audit of the Contractor's records, plus a reasonable profit or fee calculated by multiplying the profit or fee which Contractor would have otherwise earned upon completing the Work by a fraction, the numerator of which is the Cost of the Work performed through the date of termination and the denominator of which is the Contract Sum, together with reasonable actual costs of termination. Provided, however, that such fee or profit shall not exceed the fee or profit Contractor would have earned had Contractor completed the Work. Upon such termination, Contractor shall assign to Owner and Owner shall assume responsibility for obligations accruing after the date of such assignment under agreements with Subcontractors and Suppliers entered into by Contractor in order to perform the Work. Contractor shall make its records available at reasonable time and places for the Owner's audit. In the event any termination of the Contractor for default under the Contract is later determined to have been improper, the termination shall be automatically converted to a termination for convenience and the Contract shall be limited in its recovery strictly to the compensation provided for above.*

SECTION 00800

SUPPLEMENTARY CONDITIONS

PART 1 - GENERAL

1.01 SUPPLEMENTARY CONDITIONS

A. The following supplements amend, change, delete from or add to the General Conditions of the Contract, for construction, Gensler and Associates Document GCI-120189.

B. Where any article of the General Conditions is amended or any paragraph, subparagraph or clause thereof is amended or deleted by these supplements, the unaltered provisions of that article, paragraph, subparagraph or clause shall remain in effect.

ARTICLE 1: GENERAL PROVISIONS

1.1 BASIC DEFINITIONS

1.1.9.1 The term **"Owner"** as used in these Contract Documents shall mean same as **"Tenant"** or **"Client"**: Fred Alger Management, Inc.

1.1.9.2 The term **"Architect"** as used in these Contract Documents shall mean:

GENSLER
One Liberty Plaza
New York, NY
(212) 484-2440
Project Manager: Jacob Bousso
Project Architect: George Berry

1.1.9.3 The term **"Contractor"** as used in these Contract Documents shall mean the same as **"Construction Manager".**

ARTICLE 2: OWNER

2.4 Owner's Right To Carry Out The Work

2.4.1 Amend paragraph to read: "If the Contractor defaults... and fails within **the applicable period of notice and grace, as set forth in the Agreement between Owner and Contractor..."**

ARTICLE 3: CONTRACTOR

3.10 Contractors' Construction Schedules

3.10.1 Amend subparagraph to read: "The Contractor,... for the work. Such schedule shall be a critical path schedule showing at a minimum," (Deleted reference **" to be computer generated")**

3.10.2 Amend last portion of paragraph to read: "The Schedule... Contract documents, shall be revised at appropriate intervals as required by the conditions of the work and project, **but in no event less frequently than monthly..."**

3.10.3 Add subparagraph to read: **"In the event that there have been no changes in the schedule since the last update, the revision may be in the form of a writing which so states that there have been no changes. In the event that there are changes in the schedule, the revision shall be in the form of revised schedule."**

3.12.5 Amend subparagraph to read: "The Contractor shall review, **certify**, and submit to the Architect, Shop Drawings, Product Data, Samples and similar submittals... required by the Contract Documents with reasonable promptness..."

3.12.7 Amend subparagraph to read: "By **certifying** and submitting Shop Drawings, Product Data, Samples and..."

3.13 Use of Site

3.13.1 Amend paragraph to read:
"The Contractor shall confine operations at the site to areas permitted by law, ordinances, permits, **the lease** and the Contract Documents..."

3.18 Indemnification

3.18.1 Amend subparagraph as follows:
Delete **"on appeal"** in line number 7.

Delete **"to the extent such has been finally adjudicated"** in line numbers 14 and 15; and add period after **"hereunder".**

Amend the next to last sentence to read: "... described in the paragraph 3.18 **" or as contained in or required pursuant to the Agreement, between Owner and Contractor but each such indemnification shall be subject to any release of liability contained herein or in, or required pursuant to the terms of, the Agreement between Owner and Contractor."**

Amend last sentence to read: "The above indemnification **as well as any indemnity contained in or required pursuant to the Agreement** shall survive..."

ARTICLE 4: ADMINISTRATION OF THE CONTRACT

4.1 Architect

4.2.5 Amend subparagraph to read: "Based on the Architect's Observations, ... make recommendations to the Owner **or to Owner's Consultants** regarding the amounts due the Contractor."

4.3.2. Amend subparagraph to read: "Referral to Architect: Claim...may**, at the election of the parties,** be referred initially to the Architect for action...Paragraph 4.4. If the Architect agrees to hear such claims, the Architect shall be entitled to Compensation for services to be rendered."

4.3.3 Amend subparagraph to read: "Time Limits on Claims. Claims by either party **other than with respect to claims of "Unavoidable Delay" as such term is defined in the Agreement (as to which claims the provisions of the Agreement shall apply exclusively),** must be made within 15 days..."

Delete both references to "21" days and change to **"15"** days.

4.3.5.3 Amend subparagraph to read: "terms of special warranties required by the Contract Documents **or as may otherwise be provided in the Agreement."**

4.3.6 Delete both references to "21" days and change to **"15"** days.

4.4.3 Delete "shall" and add **"may"** on line 2.

Add item #4 at end of subparagraph to read: **"; or (4) may submit the claim to arbitration as provided in the Agreement. Anything contained herein to the contrary notwithstanding, the parties shall, at all times, have the option to submit any claim to arbitration pursuant to the Agreement and shall not be required to submit any claim to Architect to resolve as a precondition of its right to submit claim to arbitration pursuant to the Agreement."**

Add 4.4.5 reading as follows:

"4.4.5 Limitation on Consolidation or Joinder. No arbitration arising out of or relating to the Contract Documents shall include by consolidation or joinder or in any other manner, the Architect, the Architect's employees or consultants, except by written consent containing specific reference to the Agreement and signed by the Architect, Owner, Contractor and any other person or entity sought to be joined. No arbitration shall include, by consolidation or joinder or in any other manner,

parties other than the Owner, Contractor, or a separate contractor as described in Article 6 and other persons substantially involved in a common question of fact or law whose presence is required if complete relief is to be accorded in arbitration. No person or entity other than the Owner, Contractor or a separate contractor as described in Article 6 shall be included as an original third party or additional third party to an arbitration whose interest or responsibility is insubstantial. Consent to arbitration involving an additional person or entity shall not constitute consent to arbitration of a dispute not described therein or with a person or entity not named or described therein. The foregoing agreement to arbitrate and other agreements to arbitrate with an additional person or entity duly consented to by parties to the Agreement shall be specifically enforceable under applicable law in any court having jurisdiction thereof."

4.5 Dispute Resolution

4.5.1 Delete entire subparagraph

4.5.2 Delete entire subparagraph

ARTICLE 5: SUBCONTRACTORS

5.3 Subcontractual Relations

5.3.2 Delete the entire subparagraph and add the following subparagraph:

"Contractor shall require each subcontractor to waive all rights of recovery, claims, actions or causes of action, against Owner, Architect and the agents, partners and employees of Owner, for any loss or damage to property of subcontractor which may occur at any time during which the waivers, agreements and permissions referred to in the following sentence are required by such sentence to be in effect. Contractor shall also require each subcontractor to procure an appropriate clause in, or endorsement on, any policy of insurance carried by or on behalf of such subcontractor covering such subcontractor's personal property, tools and equipment, pursuant to which the insurance company waives subrogation or consents to a waiver of right of recovery consistent with the release, discharge, exoneration and covenants not to sue as required hereinabove."

ARTICLE 7: CHANGES IN THE WORK

7.2 Changes Orders

7.2.1 Amend subparagraph to read: "A Change Order is a written instrument prepared by the Architect **or Owner** and signed..."

7.5 Change Order Requests

7.5.2 Amend subparagraph to read: "Within five days of receipt of supplemental instruction or a **request for the submission of Change Order Request**... for such change in the work. In no more than **ten (10)** days there after, Contractor shall submit a Change Order Request...If no Change Order Request is submitted by Contractor within **fifteen (15) days**..."

ARTICLE 8: TIME

8.1 Definitions

8.1.4 Amend subparagraph to read: **"All references in the Agreement or the Contract Documents to "days" shall refer to "business days", whether or not the same shall be expressly stated herein or therein. As used herein, the term "business day" shall mean any day which shall not be a Saturday, Sunday, legal holiday in the State of New York or a day on which banking institutions in the locale are authorized by law or executive order to close."**

8.3 Delays And Extensions Of Time

8.3.1 Amend subparagraph to read: "If the Contractor is delayed at any time in progress of the work by changes ordered in the work, or by labor disputes, fire, unusual delay in deliveries, unavoidable delays or by delay authorized by the Owner..."

8.3.2 Amend paragraph to read: "Claims relating to time **or unavoidable delays shall be made in accordance with the applicable provisions of the Agreement and Paragraph 4.3."**

8.3.3 Delete entire subparagraph.

ARTICLE 9: PAYMENTS AND COMPLETION

9.3 Applications For Payment

.3.1 Amend paragraph to read: **"Prior to** the date established for each progress payment **pursuant to the Agreement,** the Contractor... with the schedule of values **as provided in the Agreement,"**

9.3.1.1 Delete the entire subparagraph.

9.4 Certificates For Payment

9.4.1 Amend subparagraph to read: "The Architect will, after consultation with Owner's Consultants, within **ten (10) days** after receipt of the Contractor's Application for Payment..."

9.5 Decisions To Withhold Certification

9.5.1 Amend subparagraph to read: "The Architect **or Owner's Consultants** may withhold a Certificate for Payment..."

9.6 Progress Payments

9.6.4 Amend subparagraph to read: "Neither the Owner, Architect **nor Owner's Consultants** shall have an obligation to pay or to see to the payment of money to a subcontractor except as may otherwise be required by law."

9.7 Failure Of Payment

9.7.1 Amend subparagraph to read: "If a Certificate for Payment **is not issued,** though no fault of the Contractor, within **ten (10)** days... or if the Owner does not pay the Contractor within **ten (10)** days...the amount certified by the Architect or **otherwise determined to be properly payable to Contractor,** then the Contractor may upon **twenty (20)** additional days written notice..."

9.8 Substantial Completion

9.8.2 Amend the last sentence to read: "In the absence of such certificate, the date of Substantial Completion shall be in accordance with **the provisions of the Agreement."**

9.8.3 Amend the subparagraph to read: "Upon Substantial Completion... issuance of a certificate by the Architect, **at the Owner's sole discretion, Owner** shall make payment, reflecting adjustment in retainage..."

9.9 Partial Occupancy Or Use

9.9.1 Amend subparagraph to read: "The Owner may occupy or use any completed or partially completed portion of the Work at any stage, provide such occupancy or use is consented to by the insurer as required under subparagraph 11.3.11 and **not prohibited** by public authorities having jurisdiction over the work..."

Delete next to last sentence which reads: **"Consent of the Contractor to partial occupancy or use shall not be unreasonably withheld."**

9.10 Final Completion And Final Payment

9.10.3 Amend subparagraph to read: "If, after substantial completion...the owner **may, at owner's sole discretion,** upon application by the Contractor..."

ARTICLE 10: PROTECTION OF PERSONS AND PROPERTY

10.1 Safety Precautions And Programs

10.1.3 *Amend second sub-subparagraph to read:* "The Contractor agrees to indemnify...reasonable attorney's fees and all legal expenses and fees incurred, (deleted **on appeal**) accruing or resulting..."

10.1.4 *Delete entire subparagraph.*

10.2 Safety Of Persons And Property

10.2.5 *Amend subparagraph to read:* "The Contractor shall promptly remedy damage and loss to property referred to in Clauses 10.2.1.2, 10.2.1.3 and 10.2.1.4. The foregoing obligations of the Contractor are in addition to the Contractor's obligations under Paragraph 3.18 **but shall be subject in all respect to the release of liability and waiver or rights of subrogation contained in and required pursuant to the Agreement."**

ARTICLE 14: TERMINATION OR SUSPENSION OF THE CONTRACT

14.1 Termination By The Contractor

14.1.2 Amend subparagraph to read: "If one of the above reasons exists, the Contractor may, upon **twenty (20)** additional days' written notice..."

14.2 Termination By The Owner For Cause

14.2.1 *Amend subparagraph to read:* "The Owner may terminate the **Agreement as provided therein."**

Delete subparagraphs 14.2.1.1, 14.2.1.2, 14.2.1.3 and 14.2.1.4.

14.2.2 Delete the entire subparagraph.

14.2.3 Delete the entire subparagraph.

14.2.4 Delete the entire subparagraph.

PART 2 - PRODUCTS [NOT USED]

PART 3 - EXECUTION [NOT USED]

END OF SECTION

SECTION 01010

SUMMARY OF WORK

PART 1 - GENERAL

1.01 WORK COVERED BY CONTRACT DOCUMENTS

A. The Construction Work includes, but not necessarily limited to, Architectural, Mechanical, Electrical, Plumbing and Fire Protection work for Fred Alger Management, Inc, One World Trade Center, New York, NY.

B. The Scope of Work for this Project is as indicated and specified in the Construction Documents prepared by Gensler and professional consultants retained by Gensler or Fred Alger Management, Inc.

1.02 RELATED REQUIREMENTS

A. Division 0: Bidding and Contract Requirements.

B. Construction Phasing Schedule outlining completion dates.

1.03 CONTRACTS

A. Construct the Work under a Contract as agreed between concerned parties to same.

B. Employ subcontractors assigned by the Owner for:

1. Work specified herein as may be designated by the Owner.

2. Relations and responsibilities between Construction Manager and assigned subcontractors shall be identical to that between contractor and subcontractors he has selected. Additionally:

a. Assigned subcontractors shall furnish to Construction Manager, bonds covering faithful performance of the sub-contract work and payment of all obligations thereunder, when the Construction Manager is required to furnish such bonds to Owner.

b. Each assigned subcontractor shall purchase and maintain liability insurance as will protect him from claims, for not less than the limits of liability which Construction Manager is required to provide to Owner.

1.04 WORK BY OWNER

A. Contractor shall coordinate with Owner's contractors for the following work, not part of this contract, to be executed before substantial completion of the contract:

1. Delivery and installation of equipment.

2. Delivery and installation of signage system.

3. Installation of Owner's Security System.

1.05 WORK SEQUENCE

A. Construct Work in phases to accommodate the Owner's use of the premises during the construction period; coordinate the construction schedule and operations with the Owner's Representative.

B. Prior to commencement of work under this Contract, a Schedule of Occupancy sequence prepared by Owner or Owner's Consultant shall form the basis for Construction Manager's Work Schedule.

1.06 CONSTRUCTION MANAGER'S USE OF PREMISES

A. Construction Manager shall limit his use of the premises for Work and related storage, to allow for:

1. Work by other contractors.

2. Owner occupancy.

B. Coordinate use of premises under direction of Construction Manager and the Owner's Consultant.

C. Assume full responsibility for the protection and safekeeping of product under this Contract, stored on the site.

D. Move any stored products, under Construction Manager's control, which interfere with operations of the Owner or separate contractor.

E. Obtain and pay for the use of additional storage or work areas needed for operations.

1.07 OWNER OCCUPANCY

A. Owner will occupy the premises or part thereof during a portion of the period of construction for the conduct of his normal operations. Cooperate with Owner's

Representative in all construction operations to minimize conflict, and to facilitate Owner usage.

B. Construction Manager shall at all times conduct his operations as to insure the least inconvenience to the general public.

1.08 PARTIAL OWNER OCCUPANCY

A. The Construction Manager shall schedule his operations for completion of portions of the Work, as designated, for the Owner's occupancy prior to Substantial Completion of the entire Work [if required].

B. Execute Certificate of Substantial Completion for each specific Portion of the Work prior to Owner occupancy.

1. After Owner occupancy, Construction Manager shall allow:

a. Access for Owner's personnel.

b. Operation of the HVAC and electrical systems.

c. Access for delivery and/or installation of Owner's and equipment.

2. Upon occupancy, Owner will provide:

a. Operation of HVAC and electrical systems.

1.09 OWNER-FURNISHED PRODUCTS

A. Products furnished and paid for by the Owner:

1. All work noted as "by Owner" on drawings.

2. All work by Owner listed under paragraph 1.04 of this Section.

B. Owner's Responsibilities:

1. Arrange for and deliver necessary shop drawings, product data and samples to the Contractor.

2. Arrange and pay for product street delivery to the site, in accordance with the construction schedule.

3. Deliver supplier's bill of materials to Construction Manager.

4. Inspect deliveries jointly with Construction Manager.

5. Submit claims for transportation damage.

6. Arrange for replacement of damaged, defective, or missing items.

7. Arrange for manufacturer's warranties, bonds, service, inspections, as required.

C. Construction Manager's Responsibilities:

1. Designate delivery date for each product in the Construction Schedule.

2. Review shop drawings, product data and samples.

   a. Submit to Architect notification of any discrepancies or problems anticipated in the use of the product.

3. Protect products from exposure to elements and damage.

4. Repair or replace items damaged during construction period.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01030

ALLOWANCES, ALTERNATES, AND UNIT PRICES

PART I - GENERAL

1.01 REQUIREMENTS INCLUDED

A. This Section identifies each Allowance, Alternate and Unit Price by number, and describes the basic changes to be incorporated into the Work, only when that Allowances, Alternates and Unit Prices are made a part of the Work by specific provisions in the Agreement between the Owner the Construction Manager

1.02 RELATED REQUIREMENTS

A. Bidding Documents: Method of quotation of the cost of each Alternate, Unit Price, and the basis of the Owner's acceptance of Allowances, Alternates and Unit Prices.

B. Agreement between Owner and Construction Manager: Incorporation of Alternates into the Work.

1.03 SCHEDULES

A. "Schedule of Allowances", "Schedule of Alternates" and "Schedule of Unit Prices" are included at the end of this Section. Specification Sections referenced in the Schedule contain requirements for materials and methods necessary to achieve the Work described under each item.

1. Include as part of each Unit Price, miscellaneous devices, accessory objects and similar items incidental to or required for a complete installation whether or not mentioned as part of the Unit Price.

1.04 COORDINATION

A. Coordinate pertinent related work and modify surrounding work as required to properly integrate the work in conjunction with allowance and unit price and to provide the complete construction required by Contract Documents.

1.05 NOTIFICATION

A. Immediately following the award of the Contract, prepare and distribute to each party involved, notification of the status of each Alternate or Unit Price. Indicate whether Alternates have been accepted, rejected or deferred for consideration

at a later date. Include a complete description of negotiated modifications to Alternates.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 SCHEDULE OF ALLOWANCES

A. None Required.

3.02 SCHEDULE OF ALTERNATES

A. None Required.

3.03 SCHEDULE OF UNIT PRICES

A. Refer to Section 03320 "Lightweight Fill, Flash Patching and Leveling Compound".

END OF SECTION

SECTION 01035

MODIFICATION PROCEDURES

PART I - GENERAL

1.01 REQUIREMENTS INCLUDED

A. This section describes administrative and procedural requirements for handling and processing contract modifications including:

1. Provisions of this section apply to the work of each subcontractor.

B. Owner will designate in writing, the person who is authorized to execute Change Orders.

1.02 RELATED REQUIREMENTS

A. The following sections contain requirements that relate to this section.

1. General and Supplementary Conditions

2. Section 01152: Applications for Payment.

3. Section 01340: Submittals

4. Section 01630: Project Options and Substitutions.

1.03 DEFINITIONS

A. Change Order: See General Conditions.

1.04 PRELIMINARY PROCEDURES

A. Owner or Architect may initiate changes by submitting a Proposal Request to the Construction Manager, including:

1. Description of the work.

2. Supplementary or revised Drawings and/or Specifications.

3. The projected time span for completing the work, and a specific statement as to whether overtime work is, or is not, authorized.

4. A specific period of time during which the requested price will be considered valid.

5. Such request is for information only, and is not an instruction to execute the work, nor to stop work in progress.

B. Construction Manager may request for changes by submitting a written notice to Architect containing:

1. Description of the proposed changes.

2. Statement of the reason for making the changes.

3. Statement of the effect on the cost of the work and schedule.

4. Statement of the effect on the work of separate subcontractors.

5. Documentation supporting any change in the cost of the work and schedule.

1.05 CONSTRUCTION CHANGE AUTHORIZATION

A. In lieu of Proposal Request, Architect may issue a Construction Change Authorization for Construction Manager to proceed with a change for subsequent inclusion in a Change Order.

B. Authorization will describe changes in the Work, both additions and deletions, with attachments of revised Contract Documents to define details of the change and will designate the method of determining any change in the cost of work or scheduling.

C. Owner and Architect will sign and date the Construction Change Authorization as authorization for the Construction Manager to proceed with the changes.

D. Construction Manager may sign and date the Construction Change Authorization to indicate agreement with the terms therein.

1.06 DOCUMENTATION OF PROPOSALS AND CLAIMS

A. Support each quotation for a lump-sum proposal, and for each unit price which has not previously been established, with sufficient substantiating data to allow Architect to evaluate the quotation.

B. On request provide additional data to support time and cost computations:

1. Labor required.

2. Equipment required.

3. Products required.

   a. Recommended source of purchase and unit price.

   b. Quantities required.

4. Taxes, insurance and bonds.

5. Credit for work deleted from cost of work, similarly documented.

6. Overhead and profit.

7. Justification for any change in schedule.

C. Support each claim for additional costs, and for work done on a time-and-material/force account basis, with documentation as required for a lump-sum proposal, plus additional information:

1. Name of the Owner's authorized agent who ordered the work, and date of the order.

2. Dates and times work was performed, and by whom.

3. Time record, summary of hours worked, and hourly rates paid.

4. Receipts and invoices for:

   a. Equipment used, listing dates and time of use.

   b. Products used, listing of quantities.

   c. Subcontracts.

1.07 PREPARATION OF CHANGE ORDERS

A. Construction Manager will prepare each Change Order.

B. Change Order will describe the Work, both additions and deletions, with attachments of or reference to revised Contract Documents to define details of the work.

C. Change Order will provide an accounting of the adjustment in the cost of the work and schedule.

1.08 LUMP-SUM/FIXED PRICE CHANGE ORDER

A. Content of Change Orders will be based on either:

1. Architect's Proposal Request signed by Construction Manager.

2. Construction Manager Proposal for a change, as recommended by Architect.

B. Owner's Authorized Representative and Architect, Engineer and Owner's Consultant (when required and designated by Owner) will sign and date the Change Order as authorization for the Construction Manager to proceed with the changes.

1.09 UNIT PRICE OWNER EXTRA ORDER

A. Content of Change Orders will be based on either:

1. Architect's definition of the scope of the required work.

2. Construction Manager's Proposal for work, as recommended by the Architect and survey of complete work.

B. The amounts of the unit prices to be as defined in Proposal Form or as agreed upon between Owner and Construction Manager.

C. When quantities of each of the items affected by the Change Order can be determined prior to start of the work:

1. Owner and Architect will sign and date the Change Order as authorization for Construction Manager to proceed with the changes.

2. Construction Manager shall sign and date the Change Order to indicate agreement with the terms therein.

D. When quantities of the items cannot be determined prior to start of the work:

1. Architect or Owner will issue a Construction Change Authorization directing Construction Manager to proceed with the work on the basis of unit prices.

2. At completion of the work, Construction Manager will determine the cost of such work based on the unit prices and quantities used.

a. Construction Manager shall submit documentation to establish the number of units of each item and any claims for a change in scheduling.

3. Construction Manager will sign and date the Change Order to establish the number of units of each item and any claims for a change in scheduling.

4. Owner will sign and date the Change Order to indicate their agreement with the terms therein.

1.10 TIME AND MATERIAL, CONSTRUCTION CHANGE AUTHORIZATION

A. Architect and Owner will issue a Construction Change Authorization directing Construction Manager to proceed with the work.

B. At completion of the work, Construction Manager shall submit itemized accounting and supporting data as provided in Article 1.06, "Documentation of Proposals and Claims", of this Section.

C. Architect will determine the allowable cost of such work, as provided in General Conditions and Supplementary Conditions.

D. Construction Manager will sign and date a Change Order to establish the change in cost of work and scheduling.

E. Owner will sign and date the Change Order to indicate their agreement therewith.

1.11 CORRELATION WITH CONSTRUCTION MANAGER'S SUBMITTALS

A. Construction Manager shall periodically revise Schedule of Values and Request for Payment forms to record each Order as a separate item of work, and to record the adjusted cost of work.

B. Construction Manager shall revise the Construction Schedule weekly to reflect each change in scheduling, including effect on other trades within and separate from this Contract.

C. Upon completion of work under a Change Order, Construction Manager shall enter pertinent changes in Record Documents.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01040

ATTIC STOCK

PART I - GENERAL

1.01 REQUIREMENTS INCLUDED

A. This Section identifies attic stock required for this Project—delivered to the Owner at designated locations after completion and acceptance of the Work.

1.02 RELATED REQUIREMENTS

A. Coordinate with the respective trade sections.

B. Agreement between Owner and Construction Manager.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 SCHEDULE OF ATTIC STOCK REQUIREMENTS

A. Section 09300 "Tile Work": 5% of each tile type and size.

B. Section 09510 "Acoustical Ceilings": 400 sq. ft. of each tile type and size.

C. Section 09650 "Resilient Flooring and Base Covering": 100 sq. ft. of each tile type and size; 100 lin. ft. of base (each type and size).

D. Section 09900 "Painting and Finishing": 2-one gallon cans of each paint type and designation.

E. Section 09985 "Fabric Wrapped Panels": 5% of each fabric type.

F. Section 10270 "Access Flooring": 5% for panels with cutouts; 5% for panels grommets.

END OF SECTION

SECTION 01041

PROJECT COORDINATION

PART 1 - GENERAL

1.01 REQUIREMENTS INCLUDED

A. The Construction Manager shall coordinate the Work of the many subcontractors for the Project.

B. Each subcontractor shall:

1. Coordinate work of his own employees and subcontractors.

2. Expedite his work to assure compliance with schedules.

3. Coordinate his Work with that of other contractors and work by Owner.

4. Comply with orders and instruction of the Construction Manager.

1.02 RELATED REQUIREMENTS

A. Section 01010: Summary of Work

B. Section 01045: Cutting and Patching

C. Section 01050: Field Engineering

D. Section 01152: Applications for Payment

E. Section 01200: Project Meetings

F. Section 01310: Construction Schedules

G. Section 01340: Submittals

H. Section 01500: Construction Facilities and Temporary Controls

I. Section 01700: Contract Closeout

1.03 CONSTRUCTION ORGANIZATION AND START-UP

A. The Construction Manager shall establish on-site lines of authority and communications.

1. Schedule and conduct preconstruction meeting and progress meetings as specified in Section 01200.

2. Establish procedures for intra-project communications:

a. Submittals

b. Reports and records

c. Recommendations

d. Coordination drawings

e. Schedules

f. Resolution of conflicts

3. Interpret Contract Documents:

a. Consult with Architect to obtain interpretation.

b. Assist in resolution of questions or conflicts.

c. Transmit written interpretations to subcontractors, and to other concerned parties.

4. Obtain permits and approvals:

a. Building permits and special permits required for Work or for temporary facilities before the commencement of any work.

b. Verify that contractors and subcontractors have obtained inspections for Work and for temporary facilities.

c. Notify persons responsible for controlled inspection in writing at least 72 hours before commencement of such work requiring controlled inspection.

5. Control the use of site:

a. Supervise field engineering and site layout.

b. Allocate space for each subcontractor's use for field offices, sheds, and work and storage areas.

c. Establish access, traffic and parking allocations and regulations.

d. Monitor use of site during construction.

1.04 CONSTRUCTION MANAGER'S DUTIES

A. Construction Schedule:

1. Coordinate schedules of the subcontractors.

2. Prepare a detailed schedule of basic operations for all subcontractors.

a. Each subcontractor shall prepare sub-schedules to comply with critical phases.

3. Monitor schedules as work progresses.

a. Identify potential variances between scheduled and probable completion dates for each phase.

b. Recommend to Owner adjustments in schedule to meet required completion dates. Adjust schedules of subcontractors as required.

c. Document changes in schedule, submit to Owner, Architect and to involved subcontractors.

4. Observe work of each subcontractor to monitor compliance with schedule.

a. Verify that labor and equipment are adequate for the work and the schedule.

b. Verify that product procurement schedules are adequate.

c. Verify that long-lead items delivery are adequate to maintain schedule.

d. Report noncompliance to Owner and Architect with recommendation for changes.

B. Process Shop Drawings, Product Data and Samples:

1. Prior to submittal to Engineer and Architect, review for compliance with Contract Documents:

a. Field dimensions and clearance dimensions.

b. Relation to available space.

c. Relation to other contracts and to other trades.

d. Effect of any changes on the work of any other contracts or other trades.

C. Review Coordination Drawings prepared by Mechanical and Electrical Subcontractors:

1. Prior to submittal to Engineer and Architect, review for compliance with Contract Documents.

D. Prepare Coordination Drawings as required to resolve conflicts and to assure Coordination of the work of, or affected by, mechanical and electrical trades, or by special equipment requirements.

1. Submit to Engineer and Architect.

2. Reproduce and distribute copies to concerned parties after Engineer and Architect review.

E. Inspection and Testing:

1. Inspect work to assure performance is in accordance with requirements of Contract Documents.

2. Administer special testing and inspections of suspect work.

3. Reject Work which does not comply with requirements of Contract Documents.

4. Coordinate Testing Laboratory Services:

a. Verify that required laboratory personnel are present.

b. Verify that tests are made in accordance with specified standards.

c. Review test reports for compliance with specified criteria.

d. Recommend and administer any required retesting.

F. Monitor the use of temporary utilities:

1. Verify that adequate services are provided and maintained.

2. Coordinate use of Owner's facilities.

G. Monitor subcontractors' periodic cleaning:

1. Enforce compliance with specifications.

2. Resolve any conflicts.

H. Arrange for delivery of Owner-furnished products.

1. Inspect for condition at delivery and supply written report to Owner.

2. Turn over to appropriate subcontractor, and obtain receipt.

I. Changes and Substitutions:

1. Recommend necessary or desirable changes to Owner and to Engineer and Architect.

2. Review subcontractors' requests for changes and substitutions; submit recommendations to Owner and to Engineer and Architect.

J. Provide cost control for Project:

1. Revise and refine the approved estimate of construction cost periodically:

a. Record actual costs, and estimates for uncompleted work.

b. Incorporate approved changes as they occur.

c. Develop cash flow reports and projections.

2. Maintain cost accounting records for authorized work performed under:

a. Unit costs

b. Actual cost for labor and materials.

c. Other basis requiring accounting records.

3. Implement procedures for review and processing of contractors' applications for progress payments and for final payments.

K. Maintain reports and records at job site, available to Architect and Owner.

1. Daily log of progress of work of each subcontractor.

2. Records:

   a. Contracts

   b. Purchase Orders

   c. Materials and equipment records

   d. Applicable documentation for handling of claims and disputes

1.05 CONSTRUCTION MANAGER'S CLOSE-OUT DUTIES

A. Mechanical and Electrical Equipment Start-up:

1. Coordinate check-out utilities, operational systems and equipment.

2. Assist in initial start-up and testing.

3. Record dates of start of operation of systems and equipment.

4. Submit to Owner written notice of beginning of warranty period for equipment put into service.

B. At completion of work of each Contract, conduct an inspection to assure that:

1. Specified cleaning has been accomplished.

2. Temporary facilities have been removed from site.

C. Substantial Completion:

1. Conduct an inspection to confirm subcontractor's list of work to be completed or corrected.

2. Assist Engineer and Architect in inspection.

3. Supervise correction and completion of work as established in Certificate of Substantial Completion.

D. When Owner occupies a portion of Project prior to final completion, coordinate established responsibilities of subcontractor and Owner.

E. Final Completion:

1. When each subcontractor determines that work is finally complete, conduct an inspection to verify completion of Work.

2. Assist Engineer and Architect in inspection.

F. Administration of contract closeout:

1. Receive and review subcontractors' final submittals.

2. Transmit to Architect with recommendations for action.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01045

CUTTING AND PATCHING

PART 1 - GENERAL

1.01 REQUIREMENTS INCLUDED

A. The Construction Manager along with his respective subcontractors shall be responsible for all cutting, fitting and patching required to complete the work or to:

1. Make its several parts fit together properly.

2. Uncover portions of the work to provide for installation of ill-timed work.

3. Remove and replace defective work.

4. Remove and replace work not conforming to requirements of Contract Documents.

5. Remove samples of installed work as specified for testing.

6. Provide routine penetrations of non-structural surfaces for installation of piping, ductwork and electrical conduit.

1.02 RELATED REQUIREMENTS

A. Section 01010: Summary of Work

B. Section 01041: Project Coordination

C. Section 01050: Field Engineering

D. Section 01630: Product Options and Substitutions

1.03 SUBMITTALS

A. Submit a written request to Architect well in advance of executing any cutting or alteration which affects:

1. Work of the Owner or any separate subcontractor.

2. Structural value or integrity of any element of the Project.

3. Integrity or effectiveness of weather-exposed (if any) or moisture-resistant elements or systems.

4. Efficiency, operational life, maintenance or safety of operational elements.

5. Visual qualities of exposed elements.

B. Request shall include:

1. Identification of the Project.

2. Description of affected work.

3. The necessity for cutting.

4. Effect on work of Owner or separate contractor, or on structural or weatherproof integrity of Project.

5. Description of proposed work:

a. Scope of cutting and patching.

b. Trades who will execute the work.

c. Products proposed to be used.

d. Extent of refinishing to be done.

6. Alternatives to cutting and patching.

7. Cost proposal, when applicable.

8. Written permission of separate contractor whose work will be affected.

C. Should conditions of Work or the schedule indicate a change of products from original installation, Contractor shall submit request for substitution as specified in Section 01630: Substitutions and Product Options.

D. Submit written notice to Architect designating the date and the time the work will be uncovered.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Comply with specifications and standards for each specific product involved.

PART 3 - EXECUTION

3.01 INSPECTION

A. Inspect existing conditions of Project, including elements subject to damage or to movement during cutting and patching.

B. After uncovering work, inspect conditions affecting installation of products, or performance of work.

C. Report unsatisfactory or questionable conditions to Architect in writing; do not proceed with work until Architect has provided further instructions.

3.02 PREPARATION

A. Provide adequate temporary support as necessary to assure structural value or integrity of affected portion of Work.

B. Provide devices and methods to protect other portions of Project from damage.

C. Provide protection from elements for that portion of the Project which may be exposed by cutting and patching work.

3.03 PERFORMANCE

A. Execute cutting and demolition by methods which will provide proper surfaces to receive installation of repairs.

B. Employ original installer and/or fabricator to perform patching for:

1. Weather-exposed or moisture-resistant elements.

2. Exposed finished surfaces.

3. Manufactured products.

C. Execute fitting and adjustment of products to provide a finished installation to comply with specified products, functions, tolerances and finishes.

D. Restore work which has been cut or removed without disturbing the integrity of the assembly; install new products to provide completed Work in accordance with requirements of Contract Documents.

E. Fit work airtight to pipes, sleeves, ducts, conduit and other penetrations through surfaces.

F. Refinish entire surfaces as necessary to provide an even finish to match adjacent finishes:

1. For continuous surfaces, refinish to nearest intersection.

2. For an assembly, refinish entire unit.

END OF SECTION

SECTION 01050

FIELD ENGINEERING

PART 1 - GENERAL

1.01 REQUIREMENTS INCLUDED

A. Provide and pay for field engineering services required for Project.

1. Survey reference lines and levels for controlling layout of space.

2. Civil, structural or other professional engineering services required to execute inspection of work subject to controlled or semi-controlled inspection requirements of the New York City Building Code.

B. Owner's Representative will identify existing control points.

1.02 RELATED REQUIREMENTS

A. Conditions of the Contract

B. Section 01010: Summary of Work

C. Section 01041: Project Coordination

D. Section 01700: Contract Closeout

1.03 QUALITY ASSURANCE

A. Qualifications of Engineer: Registered professional engineer of the discipline required for the specific service on the Project, licensed in the State of New York, acceptable to the Owner and the Architect.

1.04 REFERENCE POINTS

A. Existing basic horizontal and vertical control points for the Project are those designated on drawings.

B. Locate and protect control points prior to starting work, and preserve all permanent reference points during construction.

1. Make no changes or relocations without prior written notice to Architect.

2. Report to Architect when any reference point is lost or destroyed, or requires relocation because of necessary changes.

3. Require replacement of Project control points which may be lost or destroyed. Establish replacements based on original survey control.

1.05 PROJECT SURVEY REQUIREMENTS

A. Establish lines and levels, locate and lay out, by instrumentation and similar appropriate means:

1. Controlling lines and levels required for architectural, mechanical and electrical trades.

B. From time to time, verify layouts by same methods.

1.06 RECORDS

A. Maintain a complete, accurate log of all control and survey work as it progresses.

1.07 SUBMITTALS

A. Submit name and address of Professional Engineer to Architect.

B. On request of Architect, submit documentation to verify field engineering work.

C. When required by Architect or Code, submit certificate signed by Professional Engineer certifying that the work under review is in conformance with Contract Documents, and all applicable Code requirements.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01152

APPLICATIONS FOR PAYMENT

PART 1 - GENERAL

1.01 REQUIREMENTS INCLUDED

A. Submit Applications for Payment to Owner's Representative and Architect in accordance with the schedule established by Conditions of the Contract and Agreement between Owner and the Construction Manager.

1.02 RELATED REQUIREMENTS

A. Agreement between Owner and Construction Manager: Lump Sum and Unit Prices

B. Conditions of the Contract: Progress Payments, Retainages and Final Payment

C. Section 01370: Schedule of Values

D. Section 01700: Contract Closeout

1.03 FORMAT AND DATA REQUIRED

A. Submit itemized applications typed on AIA Document G701, Application and Certificate for Payment, and continuation sheets G701A.

1.04 PREPARATION OF APPLICATION FOR EACH PROGRESS PAYMENT

A. Application Form:

1. Fill in required information, including that for Change Orders executed prior to date of submittal of application.

2. Fill in summary of dollar values to agree with respective totals indicated in continuation sheets.

3. Execute certification with signature of a responsible officer of Contract firm.

B. Continuation Sheets:

1. Fill in total list of all scheduled component items of work, with item number and *scheduled dollar value for each item.*

2. Fill in dollar value in each column for each scheduled line item when work has been performed or products stored.

    a. Round off values to nearest dollar, as specified for Schedule of Values.

3. List each Change Order executed prior to date of submission, at the end of the continuation sheets.

    a. List by Change Order number, and description, as for an original component item of work.

C. Supporting Documentation:

1. First Application for Payment does not require partial release of liens

2. The second and all subsequent Application for Payments are to have partial release liens for each trade requesting payment for that period

1.05 SUBSTANTIATING DATA FOR PROGRESS PAYMENTS

A. When the Owner or the Architect requires substantiating data, Contractor shall submit suitable information, with a cover letter identifying:

1. Project

2. Application number and date

3. Detailed list of enclosures

4. For stored products:

    a. Item number, bills of lading and identification as shown on application.

    b. Description of specific material.

    c. Location where stored.

    d. UCC agreement and Bill of Sale.

B. Submit one copy of data and cover letter for each copy of application.

1.06 PREPARATION OF APPLICATION FOR FINAL PAYMENT

A. Fill in application as specified for progress payments.

B. Use continuation sheet for presenting the final statement of accounting as specified in Section 01700: Closeout.

1.07 SUBMITTAL PROCEDURE

A. At least one week prior to submittal of Application for Payment, the Construction Manager shall schedule a meeting to review said Application for Payment.

B. "Pre-Application" meeting shall be attended by the Construction Manager, Owner, Architect and other professional consultants as required by progress of the work.

C. Submit Applications for Payment to Owner and Architect.

D. Number: Five copies of each application.

E. When Architect finds application properly completed and correct in accordance with results of Pre-Application meeting, he will transmit certificate for payment to Owner Representative with copy to the Construction Manager.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01200

PROJECT MEETINGS

PART 1 - GENERAL

1.01 REQUIREMENTS INCLUDED

A. Construction Manager shall schedule and administer pre-construction meeting, periodic progress meetings, and specially called meetings, throughout progress of the Work.

1. Prepare agenda for meetings.

2. Distribute written notice of each meeting four days in advance of the meeting date.

3. Make physical arrangements for meetings.

4. Preside at meetings.

5. Record the minutes; include significant proceedings and decisions.

6. Reproduce and distribute copies of minutes within three days after each meeting.

a. To participants in the meeting.

b. To parties affected by decisions made at the meeting.

c. Furnish three copies of minutes t o Architect.

B. Representatives of contractors, subcontractors and suppliers attending meetings shall be qualified and authorized to act on behalf of the entity each represents.

C. Architect, Owner's Consultants including Engineers, and Owner's Representative(s) may attend as appropriate to agenda topics for each meeting to ascertain that Work is expedited consistent with Contract Documents and construction schedules. They shall not be expected to attend meetings outside the scope of their involvement.

1.02 RELATED REQUIREMENTS

A. Section 01310: Construction Schedules.

B. Section 01340: Submittals of shop drawings, product data and samples.

C. Section 01720: Project Record Documents.

E. Section 01730: Operating and Maintenance Data.

1.03 PRE-CONSTRUCTION MEETING

A. Attendance:

1. Owner's Representative.
2. Architect.
3. Professional Consultants.
4. Resident Project Representative.
5. Construction Manager's Superintendent.
6. Major subcontractors.
7. Major suppliers.
8. Others as may be deemed appropriate.

B. Suggested Agenda:

1. Distribution and discussion of:
   a. List of major subcontractors and suppliers.
   b. Projected Construction Schedules.
2. Critical work sequencing.
3. Major equipment deliveries and priorities.
4. Project Coordination.
   a. Designation of responsible personnel.
5. Procedures and processing of:
   a. Field Decisions.
   b. Proposal requests.
   c. Submittals.

d. Change Orders.

e. Applications for Payment.

6. Adequacy of distribution of Contract Documents.

7. Procedures for maintaining Record Documents, approved samples and brochures.

8. Use of premises:

a. Office, work and storage areas.

b. Owner's requirements.

9. Construction facilities, controls and construction aids.

10. Temporary utilities.

11. Safety and first-aid procedures.

12. Security procedures.

13. Housekeeping procedures.

1.04 PROGRESS MEETINGS:

A. Schedule regular periodic meetings, as required.

B. Hold called meetings as required by progress of the work.

C. Location of the Meetings: Project field office of the Construction Manager.

D. Attendance:

1. Owner's Representatives.

2. Architect and his professional consultants.

3. Subcontractors as appropriate to the agenda.

4. Suppliers as appropriate to the agenda.

5. Others as appropriate.

E. Suggested Agenda:

1. Review, approval of minutes of previous meeting.
2. Review of work progress since previous meeting. Break down for each trade or Subcontractor.
3. Field observations, problems, conflicts and remedies.
4. Problems which impede Construction Schedule.
5. Review of off-site fabrication, delivery schedules.
6. Corrective measures and procedures to regain projected schedule.
7. Revisions to Construction Schedule.
8. Progress schedule, during succeeding work period.
9. Coordination of schedules.
10. Review submittal schedules; expedite as required.
11. Maintenance of quality standards.
12. Pending changes and substitutions.
13. Review proposed changes for:
    a. Effect on Construction Schedule and on completion date.
    b. Effect on other contracts of the Project.
14. New business.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01310

CONSTRUCTION SCHEDULES

PART 1 - GENERAL

1.01 REQUIREMENTS INCLUDED

A. Promptly after award of the Contract, prepare and submit to Architect estimated construction progress schedules for the Work, with subschedules of related activities which are essential to its progress.

B. Submit revised progress schedules periodically.

1.02 RELATED REQUIREMENTS

A. Conditions of the Contract

B. Section 01010: Summary of the Work

C. Section 01200: Project Meetings

D. Section 01340: Submittals.

1.03 FORM OF SCHEDULES

A. Prepare schedules in the form of a horizontal bar chart.

1. Provide separate horizontal bar for each trade, operation or subcontractor.

2. Horizontal Time Scale: Identify the first work day of each week.

3. Scale and Spacing: To allow space for notations and future revisions.

4. Size: 8-1/2" wide by 11" high, minimum; 30" wide by 48" high, maximum.

B. Format of Listings: The chronological order of the start of each item of work.

C. Identification of Listings: By specification section numbers.

D. Each horizontal bar shall indicate as a minimum the time required for the submittal process, fabrication process where applicable, installation process and testing or final observation process. The Construction Manager shall allow sufficient amount of time for the necessary approvals by the Owner and Architect.

E. Identify milestone dates where completion of work by one trade or several trades affect the starting date or the completion of work of other trade or trades.

F. The Construction Manager in conjunction with his subcontractors shall prepare the following schedules.

1. Project schedule for the entire contract.

2. Project schedule for each phase as described in Section 01010: Summary of Work.

3. Project schedule for each floor of the building.

4. Move-in schedule for each floor or portion thereof.

1.04 CONTENT OF SCHEDULES

A. Construction Progress Schedule:

1. Show the complete sequence of construction by activity.

2. Show the dates for the beginning, and completion of, each major element of construction.

B. Submittals Schedule for Shop Drawings, Product Data and Samples: Show:

1. The projected dates for Contractor's submittals.

2. The projected dates submittals will be required for Owner furnished products.

3. The projected dates of approved submittals will be required from the Architect, Engineers and Owner's consultants.

C. Products Delivery Schedule: Show the delivery dates for:

1. Products furnished by the Owner, Section 01010.

D. Prepare and submit subschedules for each separate phase of work.

E. Provide subschedules to define critical portions of prime schedules.

1.05 PROGRESS REVISIONS

A. Indicate progress of each activity to date of submission.

B. Show changes occurring since previous submission of schedule:

1. Major changes in scope.

2. Activities modified since previous submission.

3. Revised projections of progress and completion.

4. Other identifiable changes.

C. Provide a narrative report as needed to define:

1. Problem areas, anticipated delays, and the impact on the schedule.

2. Corrective action recommended, and its effect.

3. The effect of changes on schedules of subcontractors.

1.06 SUBMISSIONS

A. Submit revised progress schedules with each application for payment.

B. Submit one reproducible transparency and one opaque reproduction each for Owner and Architect.

1.07 DISTRIBUTION

A. Distribute copies of the reviewed schedules to:

1. Jobsite file

2. Subcontractors

3. Other concerned parties

B. Instruct recipients to report promptly to the Construction Manager in writing, any problems anticipated by the projections shown in the schedules.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01340

SUBMITTALS

PART 1 - GENERAL

1.01 REQUIREMENTS INCLUDED

A. This section describes general procedural requirements for ongoing submittals for the wing:

1. Submittal schedule

2. Shop drawings

3. Product data and brochures

4. Samples

5. Manufacturer's certificates, test reports, guarantees, warranties and maintenance procedures; and testing criteria for toxicity or toxic emissions..

6. Manufacturer's material safety data sheets [MSDS].

B. See also each applicable specification section for additional information and requirements.

C. Architect's Review of Submittals (The Architect may designate portions of the Work to be reviewed by his consultants.):

1. The Architect shall review such documents and materials that are required by the Contract Documents to be submitted, but only for conformance with the design intent of the Work and with the information given in or inferable from the Contract Documents.

2. Such reviews are general reviews of the submittals for conformance with the Contract Documents only, and do not necessarily include checks of detailed dimensions, field measurements, quantities, related assemblies and materials, fabrication or construction methods, and the like.

3. The Architect may note exceptions taken or not taken, corrections necessary, if observed, and resubmittals required, and will return the documents or materials with such notations to the Construction Manager.

4. Review and action on an item that is a component of an assembly or system shall not necessarily apply to the entire assembly or system.

5. The reviews shall not relieve the Construction Manager or his subcontractors from conformance with the Contract Documents, or imply approval of changes to the Contract Documents, whether or not such nonconformities are discovered in the submittals.

6. Such review and action by both the Construction Manager and the Architect shall be taken with reasonable promptness, taking into account the complexity and extent of the submittal, and delivery times.

7. The submittal procedure shall not be used as a substitute for change requests or change approvals, or for other procedures required by the Contract Documents.

G. Designate in the Construction Schedule, or in a separate coordinated schedule, the projected dates for submission and the dates that reviewed shop drawings, product data and samples will be needed.

1.02 RELATED REQUIREMENTS

A. Conditions of the Contract

B. Section 01720: Project Record Documents

C. Section 01730: Operating and Maintenance Data

D. Section 01740: Warranties and Bonds

1.03 PROCEDURES

A. Construction Manager shall prepare "submittal schedule" coordinating submittal dates with construction schedule dates and allowing reasonable time for Architect's review.

B. Construction Manager shall review shop drawings, product data and samples to verify compliance with Contract Documents prior to submission to Architect. Affix stamp and initial on each submittal to certify review.

C. Submittals promptly in accordance with accepted submittal schedule, and in sequence with progress schedule so as to cause no delay in the work or in the work of any other contractor.

D. Determine and verify field measurements, field construction criteria, catalog numbers and similar data on submittals.

E. Coordinate each submittal with requirements of the work and of the Contract Documents.

F. Schedule preliminary review meeting with Construction Manager, subcontractor, Architect and Engineer (when applicable) to preview more complicated submittals and resolve any outstanding issues prior to final submission.

G. Transmit each item under AIA Form 810 or a similar form approved by the Architect.

1. Identify project, Construction Manager, subcontractor, major supplier and date.

2. Identify by reference pertinent drawing sheet and detail number, floor number and room number, and specification section number as appropriate.

3. Identify any deviations in the submittals from intent of Contract Documents and the reasons.

4. Provide adequate space for Construction Manager's, Architect's and Engineers' (where applicable) review stamps.

5. Resubmittals shall bear the previous submittal's number with subnumber or letter, and dates of previous submission.

H. After Architect's review of submittal, revise and resubmit as required, identify changes made since previous submittal.

I. Distribute copies of reviewed and accepted submittals for coordination with concerned persons. In addition copies, shall be maintained in job site file and record documents file. Instruct recipients to promptly report any inability to comply with provisions.

1.04 SUBMITTAL SCHEDULE

A. Submittal Schedule for submission of shop drawings, product data, samples and project delivery dates, shall be directly coordinated with the Construction Schedule.

1. Allow at least ten (10) working days for review by the Architect following receipt of the submittal, excluding mailing time.

2. Allow time for resubmission of submittals which may be unacceptable.

3. Include written verification to architect that custom or long-term items have been ordered in sufficient time to meet construction schedule.

4. Submit within 30 days after award of contract.

1.05 SHOP DRAWINGS

A. Shop drawings shall be presented in a clear and thorough manner; reproduction of Contract Documents submitted as shop drawings will not be accepted.

B. *Submit one reversed reading reproducible transparency and two prints. Architect shall* retain prints, and return reproducible. Construction Manager shall reproduce off the marked transparency and distribute accordingly.

C. Minimum Sheet Size: 8½" x 11"; Maximum Sheet Size: 30" x 48".

1.06 PRODUCT DATA/MANUFACTURERS' LITERATURE

A. Mark each copy to identify applicable products, models, options, and other data, such as capacities, required clearances, wiring or piping diagrams and controls. Supplement manufacturers' standard data to provide information unique to the Work.

B. Modify standard drawings and diagrams to delete information not applicable to project.

C. Include manufacturers' installation instructions when required by the specification section.

D. Submit the number of copies which will be required for distribution, plus two copies which will be retained by Architect.

1.07 SAMPLES

A. Where products, materials or finishes are indicated to be "standard as selected by Architect", submit full range of manufacturer's standard colors, textures, and patterns for Architect's selection.

B. Submit samples from actual dye lots or production runs to be used.

C. Samples of materials requiring treatment such as "Scotchguarding" or fire treatment shall be submitted with such treatment already applied.

D. Where variation of color, texture or pattern is anticipated, submit sufficient number of samples to show the extent of the variation. Products not within the accepted ranges shall be rejected.

E. Submit samples to illustrate functional characteristics of the product, with integral parts and attachment devices. Coordinate submittal of different categories for interfacing work.

F. Include identification on each sample, giving full information. Where clear space is not available, submit with tags or sticker attached.

G. Submit three samples unless otherwise specified. One will be retained by Architect, one by subcontractor, and one shall be maintained by Construction Manager at job site.

H. Provide the following sizes (unless otherwise specified):

1. Flat or Sheet Products: 8½" by 11"

2. Linear Products: 12" long

3. Bulk Products: One pint

I. Field Samples and Mock-ups:

1. The subcontractor responsible for the work shall erect mock-up as specified in Construction Documents, at the Project site, at a location acceptable to the Architect.

2. Size or Area shall be as specified in the respective specification section.

3. Fabricate each sample and mock-up complete and finished.

4. Remove mock-ups at conclusion of work or when acceptable to the Architect.

1.08 MANUFACTURER'S CERTIFICATES, TEST REPORTS AND GUARANTEES

A. Submit manufacturers' certificates, test reports and guarantees, in duplicate, in accordance with requirements of each specification section.

B. Submit testing criteria to show toxicity or toxic emissions [if any] of the products and materials used as part of the Work of this Contract.

1.09 MANUFACTURER'S MATERIAL SAFETY DATA SHEETS

A. Submit manufacturers' material safety data sheets [MSDS] in duplicate, for each product specified and each sample required as specified in the respective specifications sections.

1.10 CONSTRUCTION MANAGER'S RESPONSIBILITIES

A. Review shop drawings, product data and samples prior to submission.

B. Determine and verify:

1. Field measurements

2. Field construction criteria

3. Catalog numbers and similar data

4. Conformance with specifications

C. Coordinate each submittal with requirements of the Work and of the Contract Documents.

D. Notify the Architect in writing, at time of submission, of any deviations in the submittals from requirements of the Contract Documents.

E. Begin no fabrication or work which requires submittals until return of submittals indicating the appropriate action.

1.11 SUBMISSION REQUIREMENTS

A. Make submittals promptly in accordance with approved schedule, and in such sequence as to cause no delay in the Work or in the work of any other contractor.

B. Number of Submittals Required:

1. Submit as follows:

		REPRODUCIBLE	TRANSPARENCY	OPAQUE REPRODUCTION
C.	Architectural:			
1.	Architect:	1 copy		1 copy
2.	Owner:	1 copy		1 copy
D.	Engineer/Architectural:			
1.	Engineer:	1 copy		1 copy
2.	Architect:	--		1 copy
3.	Owner	--		1 copy
E.	Acoustical/Architectural:			
1.	Acoustical Eng.	1 copy		1 copy
2.	Engineer:	--		1 copy
3.	Architect:	--		1 copy

4.	Owner:	--	1 copy

F. Structural/Architectural:

1.	Structural Eng.:	1 copy	1 copy
2.	Engineer:	--	1 copy
3.	Architect:	--	1 copy
4.	Owner:	--	1 copy

G. Product Data: Submit the number of copies which the Construction Manager requires, plus two which will be retained by the Architect.

H. Samples: Submit the number stated in each specification section.

I. Submittals shall contain:

1. The date of submission and the dates of any previous submissions.
2. The Project title, number, floor and room numbers.
3. Contract identification.
4. The names of:
   a. Contractor
   b. Supplier
   c. Manufacturer
5. Identification of the product, with the specification section number.
6. Field dimensions, clearly identified as such.
7. Relation to adjacent or critical features of the work or materials.
8. Applicable standards, such as ASTM or Federal Specification.
9. Identification or deviations from Contract Documents and the reasons.
10. Identification of revisions on resubmittals.
11. An 8" x 3" blank space for Architect's action stamps.

12. Construction Manager's stamp, initialed or signed, certifying to review of submittal, verification of products, field measurements and field construction criteria, and coordination of the information within the submittal with requirements of the Work and of Contract Documents.

1.12 RESUBMISSION REQUIREMENTS

A. Make any corrections or changes in the submittals required by the Architect, Engineer and Owner's consultants and resubmit.

B. Shop Drawings and Product Data:

1. Revise initial drawings or data, and resubmit as specified for the initial submittal.

2. Indicate any changes which have been made other then those requested by the Architect.

C. Samples: Submit new samples as required for initial submittal.

1.13 DISTRIBUTION

A. Distribute reproductions of shop drawings and copies of product data which carry the Architect, Engineer and/or Owner's consultant's stamp of action as applicable to:

1. Jobsite file

2. Record Documents file

3. Other affected contractors

4. Subcontractors

5. Supplier or fabricator

6. Owner's Representative

B. Distribute samples which carry the Architect, Engineer and/or Owner's consultants stamp as directed by the Architect.

1.14 ARCHITECT, ENGINEER AND OWNER'S CONSULTANTS DUTIES

A. Review submittals with reasonable promptness and in accordance with schedule.

B. The Architect will review submittals and each submittal will be stamped indicating the Architect's action as noted. Notations by the Architect which increase Contract cost or

time of completion shall be brought to the Architect's attention before proceeding with the annotated Work.

C. The Architect's review shall not be construed as an indication that submittal is correct or suitable nor that work represented by submittal complies with the Contract Documents, except at to matters of finish, color, and other aesthetic matters left to the Architect's decision by the Contract Documents.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01370

SCHEDULE OF VALUES

PART 1 - GENERAL

1.01 REQUIREMENTS INCLUDED

A. Submit to the Architect and Owner, a Schedule of Values allocated to the various portions of the Work, within ten days after award of Contract.

B. Upon request of the Architect, support the values with data which will substantiate their correctness.

C. The Schedule of Values, unless objected to by the Architect, shall be used only as the basis for the Construction Manager's Applications for Payment.

1.02 RELATED REQUIREMENTS

A. Conditions of the Contract

B. Section 01152: Application for Payment

1.03 FORM AND CONTENT OF SCHEDULE OF VALUES

A. Type schedule on 8½" x 11" white paper; Construction Manager's standard forms and automated printout will be considered for approval by Architect and Project Consultant upon request of Construction Manager. Identify schedule with:

1. Title of Project and location

2. Architect And Project number

3. Name and address of Construction Manager

4. Contract designation

5. Date of submission

B. Schedule shall list the installed value of the component parts of the Work in sufficient detail to serve as a basis for computing values for progress payments during construction.

C. Follow the table of contents of this Project Specification as the format for listing component items.

1. Identify each line item with the number and title of the respective section of the specifications.

D. For each major line item list sub-values of major products or operations under the item.

1. Construction Manager shall provide a separate listing of contract conditions as follows:

a. Bonds

b. Insurance Premiums

c. Field Supervision and Layout

d. Construction Facilities and Temporary Controls

e. Job Mobilization

f. Contingency Allowance

E. For the various portions of the Work:

1. Each item shall include a directly proportional amount of the Construction Manager's overhead and profit.

2. For items on which progress payments will be requested for stored materials, break down the value into:

a. The cost of the materials, delivered and unloaded, with the taxes paid.

b. The total installed value.

3. Submit a subschedule for each separate stage of work specified in Section 01010.

1.04 SUBSCHEDULE OF UNIT MATERIAL VALUES

A. Submit a subschedule of unit costs and quantities for:

1. Products specified under a unit cost allowance (if any).

2. Products on which progress payments will be requested for stored products.

B. The form of submittal shall parallel that of the Schedule of Values, with each item identified the same as the line item in the Schedule of Values.

C. The Unit quantity for bulk materials shall include an allowance for normal waste.

D. *The unit values for the materials shall be broken down into:*

1. Cost of the material, delivered and unloaded at the site, with taxes paid.

2. Installation costs, including Construction Manager's overhead and profit.

E. The installed unit value multiplied by the quantity listed shall equal the cost of that item in the Schedule of Values.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01400

QUALITY CONTROL AND TESTING

PART 1 - GENERAL

1.01 REQUIREMENTS INCLUDED

A. This section describes general quality control requirements, including:

1. Manufacturer's field services.

2. Independent testing services.

3. Field samples and mock-ups.

1.02 QUALITY CONTROL, GENERAL

A. Maintain quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce work of specified quality.

1.03 MANUFACTURER'S FIELD SERVICES

A. When specified in respective sections, require manufacturer or supplier to provide qualified personnel to provide on-site observations and recommendations to ensure specifications are met.

1. Observe field conditions, conditions of surfaces and installation, quality or workmanship.

2. Observe quality of workmanship.

3. Provide recommendations to assure acceptable installation and workmanship.

4. Where required start, test and adjust equipment as applicable.

B. Representative shall submit written report to Architect listing observations and recommendations.

1.04 TESTING SERVICES

A. Provide testing services required by various specification sections and by local authorities for conformance to applicable codes.

1. Construction Manager shall make arrangements for testing services, with the acceptance of the Owner and Architect. The Owner shall pay for testing services except where retesting occurs caused by the Construction Manager with his subcontractors.

B. An independent testing agency shall perform such inspections, tests, and other services.

1. Tests shall include HVAC Testing and Balancing by certified contractor.

2. Tests shall include Testing and Inspection of firestopping.

C. Services shall be performed in accordance with requirements of governing authorities and with specified standards.

D. Reports shall be submitted to Architect in duplicate giving observations and results of tests, indicating compliance or non-compliance with specified standards and with Contract Documents.

E. Construction Manager and his subcontractors shall cooperate with testing personnel, furnish tools, samples of materials, design mix, equipment, storage and assistance as requested.

1. Notify Architect and testing personnel sufficiently in advance of expected time for operations requiring testing services.

1.05 FIELD SAMPLES AND MOCK-UPS

A. Erect field samples and mock-ups for review and use as quality standard. In accordance with requirements of the various specification sections. Complete and coordinate, sufficiently in advance of fabrication of custom items and field installation of standard products for Architect's review of finish and appearance.

1.06 MOCK-UP REQUIREMENTS

A. Provide mock-ups and field samples in sizes indicated and as required to represent the scope of work.

B. Provide mock-ups that are complete, accurate and conforming to the requirements of the work. When mock-ups are required to be by many trades or a system, provide a system or assembly that is complete with all work finished. Allow for Architect's review during installation of all assemblies.

C. Mock-ups shall be considered as a submittal and shall be "submitted" for the review and approval of the Architect and Owner per the requirements of Section 01300.

D. Incorporate mock-ups into the final installation where permitted by the Architect.

E. Mock-ups and field samples will be reviewed by the Architect for conformance to appearance and finish only. Compliance with all other requirements is the exclusive responsibility of the Contractor.

F. Make adjustments, modifications and changes to the mock-up until the mock-up is approved. Do not proceed with fabrication affected by mock-up acceptance.

G. Final reviewed mock-up will represent the standard for the work. All work not conforming to the approved mock-up as to finish and appearance as determined by the Architect shall be removed and replaced at no cost to the Owner.

H. All decisions by the Architect regarding conformance to the work meeting the appearance and finish of the mock-ups shall be final.

I. The Construction Manager shall allow for review time in schedule to permit proper review and modification time to ensure compliance with the Contract Documents for quality, workmanship, appearance, finish and performance, and to meet the Construction Schedule.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01410

TESTING LABORATORY SERVICES

PART 1 - GENERAL

1.01 REQUIREMENTS INCLUDED

A. Owner will employ and pay for the services of an Independent Testing Laboratory to perform specified testing.

1. Construction Manager shall cooperate with the laboratory to facilitate the execution of its required services.

2. Employment of the laboratory shall in no way relieve the obligation of the Construction Manager to perform the Work of the Contract.

B. Construction Manager shall pay for the services of an Independent Testing Laboratory to perform specified services and testing when work executed fails testing due to his negligence or that of his subcontractors.

1.02 RELATED REQUIREMENTS

A. Conditions of the Contract: Inspections and testing required by laws, ordinances, rules, regulations, orders or approvals of public authorities.

B. Respective Sections of Specifications: Certification of products.

C. Each specification section or trade listed: Laboratory tests required, and standards for testing.

D. Testing Laboratory inspection, sampling and testing is required for:

1. Metal fabrications (miscellaneous steel).

2. Firestopping.

3. MEP Divisions 15 & 16 - As required. Refer to Mechanical and Electrical Drawings.

1.03 QUALIFICATION OF LABORATORY

A. Meet "Recommended Requirements for Independent Laboratory Qualification", published by American Council of Independent Laboratories.

B. Meet basic requirements of ASTM E329, "Standards of Recommended Practice for Inspection and Testing Agencies for Construction."

C. Authorized to operate in the State of New York and is acceptable to the Department of Buildings of the City of New York.

D. Submit copy of report of inspection of facilities made by Materials Reference Laboratory of National Bureau of Standards during the most recent tour of inspection, with memorandum of remedies of any deficiencies reported by the inspection.

E. Testing Equipment:

1. Calibrated at reasonable intervals by devices of accuracy traceable to either:

a. National Bureau of Standards.

b. Accepted values of natural physical constants.

1.04 LABORATORY DUTIES

A. Cooperate with Architect and Construction Manager; provide qualified personnel after due notice.

B. Perform specified inspections, sampling and testing of materials and methods of construction.

1. Comply with specified standards.

2. Ascertain compliance of materials with requirements of Contract Documents.

C. Promptly notify Architect and Construction Manager of observed irregularities or deficiencies of work or products.

D. Promptly submit five copies of written report of each test and inspection to Architect. Each report shall include:

1. Date issued.

2. Project title and number.

3. Testing laboratory name, address and telephone number.

4. Name and signature of laboratory inspector.

5. Date and time of sampling or inspection.

6. Record of temperature and weather conditions.

7. Date of test.

8. Identification of product and specification section.

9. Location of sample or test in the Project.

10. Type of inspection or test.

11. Results of tests and compliance with Contract Documents.

12. Interpretation of test results, when requested by Architect.

1.05 LIMITATIONS OF AUTHORITY OF TESTING LABORATORY

A. Laboratory is not authorized to:

1. Release, revoke, alter or enlarge on requirements of Contract Documents.

2. Approve or accept any portion of the Work.

3. Perform any duties of the Construction Manager or his subcontractors.

1.06 CONSTRUCTION MANAGER'S RESPONSIBILITIES

A. Cooperate with laboratory personnel, provide access to Work, to manufacturer's operations.

B. Secure and deliver to the laboratory adequate quantities of representational samples of materials proposed to be used and which require testing.

C. Provide to the laboratory the preliminary design mix proposed to be used for concrete, and other materials mixes which require control by the testing laboratory.

D. Furnish copies of products test reports as required.

E. Furnish incidental labor and facilities:

1. To provide access to work to be tested.

2. To obtain and handle samples at the Project site or at the source of the product to be tested.

3. To facilitate inspections and tests.

4. For storage and curing of test samples.

F. Notify laboratory sufficiently in advance of operations to allow for laboratory assignment of personnel and scheduling of tests.

1. When tests or inspections cannot be performed after such notice, reimburse Owner for laboratory personnel and travel expenses incurred due to Contractor's negligence.

G. Employ and pay for the services of a separate, equally qualified independent testing laboratory to perform additional inspections, sampling and testing required:

1. For Construction Manager's convenience.

2. When initial tests indicate Work does not comply with Contract Documents.

H. Make arrangements with laboratory and pay for additional samples and tests required for Construction Manager's convenience.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01500

CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS

PART 1 - GENERAL

1.01 REQUIREMENTS INCLUDED

A. Provide and maintain construction facilities and temporary controls as required and as specified herein.

B. Comply with federal, state and local codes and regulations, utility company and/or Rules of the Building.

1.02 RELATED REQUIREMENTS

A. Conditions of the Contract

B. Section 01010: Summary of Work

C. Mechanical Work: Refer to Mechanical Drawings.

D. Electrical Work: Refer to Electrical Drawings.

PART 2 - PRODUCTS

2.01 MATERIALS, GENERAL

A. Materials may be new or used, but must be adequate in capacity for the required usage, must not create unsafe conditions, and must not violate requirements of applicable codes and standards.

2.02 CONSTRUCTION AIDS

A. Provide (as applicable) scaffolds, staging, temporary ladders and stairs, protective railings, hoists, cranes, chutes, fire protection devices, and other similar facilities and equipment as needed for construction.

B. Dust and Pollution Control: Provide materials and equipment necessary to comply with requirements of governing agencies for dust and pollution control.

C. Maintain facilities and equipment in first-class condition.

2.03 TEMPORARY BARRIERS/ENCLOSURES

A. Provide temporary enclosures to separate work areas of building occupied by Owner; to prevent penetration of moisture into interior building areas, to prevent damage to equipment, and to protect Owner's employees and operations from construction work. Provide as required to prevent entry of unauthorized persons into construction areas. Provide doors with self-closing hardware and locks.

B. Maintain for the entire length of the work all required exits to conform with regulations of governing agencies.

2.04 CLEANING DURING CONSTRUCTION

A. Control accumulation of waste materials and rubbish; legally dispose of off-site daily.

B. Clean areas prior to start of finish work; maintain areas free of dust and other contaminants during finishing operations.

2.05 FIELD OFFICE

A. Provide field office as required for Contractor's operations with space for project meeting to accommodate minimum of 16 persons and relocate as necessary on a Phase by Phase basis.

2.06 SECURITY PROGRAM

A. Initiate security program in coordination with Owner, prior to job mobilization, and maintain throughout construction period, until Owner's acceptance of space.

B. Protect Work, stored products and construction equipment from theft and vandalism.

C. Protect Owner's operations at site from theft, vandalism and damage from Contractor's work or employees.

2.07 TEMPORARY ELECTRICITY AND LIGHTING

A. Provide connections to existing facilities [if available], size to provide service required for power and lighting; Owner will pay the costs of power used.

B. Install circuit and branch wiring, with area distribution boxes located so that power and lighting is available throughout the construction by the use of construction-type power cords.

C. Provide adequate artificial lighting for all areas of work when natural light is not adequate for work, and for areas accessible to the public.

2.08 TEMPORARY VENTILATION

A. Provide temporary ventilation as required to maintain adequate environmental conditions to facilitate progress of the Work, to meet specified minimum conditions for the installation of materials, and to protect materials and finishes from damage due to temperature or humidity.

B. Provide accelerated or extended ventilation with maximum outside air of all spaces during and immediately after installations of materials: to cure installed materials, to disperse humidity, and to prevent hazardous accumulations of dust, fumes, vapors or gases.

1. To ensure optimal indoor air quality prior to occupancy, extended (24 hours) ventilation "bake-out" period shall continue a minimum of one week after final installation.

C. Pay all costs of installation, maintenance, operation and removal, and for fuel consumed. Owner will pay costs of fuel used from the existing system.

D. Provide weekly inspection of HVAC filters where HVAC system is operable.

1. Filters shall be replaced as necessary during construction to provide adequate ventilation and temperature.

2. Provide new filters upon completion of work.

2.09 TEMPORARY TELEPHONE SERVICE

A. Arrange with local telephone service company, provide direct line telephone service at the construction site for the use of personnel and employees. Service required:

1. One direct line instrument in the Field Office.

2. Other instruments at the option of the Contractor, or as required by regulations.

B. Pay all costs for installation, maintenance and removal, toll calls and service charges for local calls.

2.10 TEMPORARY WATER

A. Make connections to existing facilities, provide water for construction purposes; Owner will pay costs of water used.

B. Install branch piping with taps located so that water is available through out the construction by the use of hoses. Protect piping and fittings against freezing.

2.11 TEMPORARY SANITARY FACILITIES

A. Service, clean and maintain facilities and enclosures.

B. Facilities and their maintenance shall meet the requirements of the State and local health regulations and ordinances. Any such facilities or maintenance methods failing to meet these requirements shall be corrected immediately.

2.12 PEST CONTROL

A. Provide protection against rodents, bugs, insects, etc. This protection shall include continual policing of all areas to remove all food and drink items daily.

B. In the event that pests occur, hire licensed professional exterminator for their elimination. Construction Manager shall be responsible for damage that may result from pests.

C. Completed project shall be free of all such pests.

D. No chemical treatments will be will be allowed for insect or rodent control unless specifically allowed by the Owner. Construction Manager submit alternative methods of pest control for review.

PART 3 - EXECUTION

3.01 GENERAL

A. Coordinate with Division 15 - Mechanical, and Division 16 - Electrical.

B. Maintain and operate systems to assure continuous service.

C. Modify and extend systems as work progress requires.

3.02 REMOVAL

A. Completely remove temporary materials and equipment when their use is no longer required.

B. Clean and repair damage caused by temporary installations or use of temporary facilities.

C. Restore permanent facilities used for temporary services to specified condition.

1. Replace all lamps in permanent fixtures used for temporary light.

2. Replace all parts, including enclosure, of permanent HVAC units used for temporary HVAC services.

END OF SECTION

SECTION 01540

SECURITY

PART 1 - GENERAL

1.01 REQUIREMENTS INCLUDED

A. Provide a project security program, to Protect Work, stored products and construction equipment from theft and vandalism.

B. Comply with security requirements of Owner.

1.02 RELATED REQUIREMENTS

A. Section 01200: Project Meetings

B. Section 01500: Construction Facilities and Temporary Controls

1.03 MAINTENANCE OF SECURITY

A. Initiate security program in compliance with Owner's system, prior to job mobilization.

B. Maintain security program throughout construction period, until Owner's acceptance precludes the need for Construction Manager's security.

1.04 ENTRANCE CONTROL

A. Provide control of all persons entering and leaving Project site.

1. Allow no visitors except with issuance of temporary identification from Owner's authorized representatives.

2. Maintain log of visitors.

B. Owner will control deliveries and vehicles related to his own operations.

1.05 MISCELLANEOUS RESTRICTIONS

A. No photograph of any kind shall be taken except with the approval of the Owner.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01600

MATERIAL AND EQUIPMENT

PART 1 - GENERAL

1.01 REQUIREMENTS INCLUDED

A. Materials and Equipment Incorporated into the Work:

1. Conform to applicable specifications and standards.

2. Comply with size, make, type and quality specified, or as specifically approved in writing by the Architect.

3. Manufactured and Fabricated Products:

a. Design, fabricate and assemble in accordance with the best engineering and shop practices.

b. Manufacture like parts of duplicate units to standard sizes and gauges, to be interchangeable.

c. Two or more items of the same kind shall be identical, by the same manufacturer.

d. Products shall be new and suitable for service conditions.

e. Equipment capacities, sizes and dimensions shown or specified shall be adhered to unless variations are specifically approved in writing.

4. Do not use material or equipment for any purpose other than that for which it is designed or is specified.

1.02 RELATED REQUIREMENTS

A. Conditions of the Contract

B. Section 01010: Summary of work

C. Section 01340: Submittals

D. Section 01630: Substitutions and Product Options

E. Section 01700: Contract Closeout

1.03 MANUFACTURER'S INSTRUCTIONS

A. When Contract Documents require that installation of work shall comply with manufacturers' printed instructions, obtain and distribute copies of such instructions to parties involved in the installation, including two copies to Architect and one copy to Owner.

1. Maintain one set of complete instructions at the job site during installation and until completion.

B. Handle, install, connect, clean, condition and adjust products in strict accord with such instructions and in conformity with specified requirements.

1. Should job conditions or specified requirements conflict with manufacturers' instructions, consult with Architect for further instructions.

2. Do not proceed with work without clear instruction.

C. Perform work in accord with manufacturers' instructions. Do not omit any preparatory step or installation procedure unless specifically modified or exempted by Contract Documents.

1.04 INDOOR AIR QUALITY

A. Materials which emit volatile organic compounds (VOC) e.g., paint, adhesives, sealants, etc., shall as a minimum comply with latest EPA recommendations to optimize indoor air quality in completed space.

1. Manufacturer shall provide instruction for off site procedures to minimize the emissions of volatile organic compounds from their products prior to installation.

2. Manufacturers shall supply materials and products which have to the lowest content by volume of toxic or irritating chemicals and conform with the functional requirements for the product application.

3. Manufacturer's instructions shall recommend the smallest quantity of material required to conform with the functional requirements for the product application.

B. Contractor shall coordinate with procedures as described in Section 01500 for ventilation during and after installation of materials with potential VOC emissions.

1.05 TRANSPORTATION AND HANDLING

A. Arrange deliveries of products in accord with construction schedules, coordinate to avoid conflict with work and conditions at the site.

1. Deliver products in undamaged condition, in manufacturers' original containers or packaging, with identifying labels intact and legible.

2. Immediately on delivery, inspect shipments to assure compliance with requirements of Contract Documents, and that products are properly protected and undamaged.

B. Provide equipment and personnel to handle products by methods to prevent soiling or damage to products or packaging.

1.06 STORAGE AND PROTECTION

A. Store products in accord with manufacturers' instructions, with seals and labels intact and legible.

1. Store products subject to damage by the elements in weathertight enclosures.

2. Maintain temperature and humidity within the ranges required by manufacturers' instructions.

B. Exterior Space:

1. Store products above the ground, on blocking or skids to prevent soiling or staining. Cover products which are subject to deterioration with impervious sheet coverings. Provide adequate ventilation to avoid condensation.

2. Store loose granular materials in a well-drained area on solid surfaces to prevent mixing with foreign matter.

C. Arrange storage for easy access for inspection. Make periodic inspections of stored products to assure that products are maintained under specified conditions, and free from damage or deterioration.

D. Protection after Installation: Provide substantial coverings as necessary to protect installed products from damage from traffic and subsequent construction operations. Remove when no longer needed.

E. Maintain and update records of stored materials.

1.07 PRODUCT OPTIONS AND SUBSTITUTIONS

A. Refer to Section 01630.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01620

STORAGE AND PROTECTION

PART 1 - GENERAL

1.01 REQUIREMENTS INCLUDED

A. Provide secure storage and protection for products to be incorporated into the work, and maintenance and protection for products after installation and until completion of the Work.

1.02 RELATED REQUIREMENTS

A. The respective specification section: Special requirements for specific products as required in Division 2 through 16.

1.03 STORAGE

A. Store products immediately on delivery, and protect until installed in the Work. Store in accordance with manufacturer's instructions, with seals and labels intact and legible

B. Store products subject to damage by elements in substantial weathertight enclosures.

1. Maintain temperatures within ranges required by manufacturer's instructions.

2. Provide humidity control for sensitive products, as required by manufacturer's instructions.

3. Store unpacked products on shelves, in bins or in neat piles, accessible for inspection.

C. Exterior Storage:

1. Provide substantial platforms, blocking or skids to support fabricated products above ground, prevent soiling or staining.

a. Cover products, subject to discoloration or deterioration from exposure to the elements, with impervious sheet coverings. Provide adequate ventilation to avoid condensation.

2. Store loose granular materials on solid surfaces such as paved areas, or provide plywood or sheet materials to prevent mixing with foreign matter.

a. Provide surface drainage to prevent flow or ponding of rainwater.

b. Prevent mixing of refuse or chemically injurious materials or liquids.

D. Arrange storage in manner to provide easy access for inspection.

E. Construction Manager shall verify structural loading with a licensed professional engineer to comply with existing load capacities subject to review of Architect and Owner and their consultants.

1.04 MAINTENANCE OF STORAGE

A. Maintain periodic system of inspection of stored products on scheduled basis to assure that:

1. State of storage facilities is adequate to provide required conditions.

2. Required environmental conditions are maintained on continuing basis.

3. Surfaces of products exposed to elements are not adversely affected.

4. Any weathering of products, coatings and finishes is acceptable under requirements of Contract Documents.

5. Records of stored items are kept up to date.

B. Mechanical and electrical equipment which requires servicing during long-term storage shall have complete manufacturer's instructions for servicing accompanying each item, with notice of enclosed instructions shown on exterior of package.

1. Comply with manufacturer's instructions on scheduled basis.

1.05 PROTECTION AFTER INSTALLATION

A. Provide protection of installed products to prevent damage from subsequent operations. Remove when no longer needed, prior to completion of work.

B. Control traffic to prevent damage to equipment and surfaces.

C. Provide coverings to protect finished surfaces from damage.

1. Cover projections, wall corners, and jambs, sills and soffits of openings, in areas used for traffic and for passage of products in subsequent work.

2. In areas subject to foot traffic, secure masonite board in place.

3. For movement of heavy products, lay planking or similar materials in place.

4. For storage of products, lay tight wood sheathing in place.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01630

PRODUCT OPTIONS AND SUBSTITUTIONS

PART 1 - GENERAL

1.01 REQUIREMENTS INCLUDED

A. Furnish and install products specified, under options and conditions for substitutions stated in this Section.

1.02 RELATED REQUIREMENTS

A. Section 01030: Allowances, Alternates and Unit Prices

B. Section 01340: Submittals

C. Section 01700: Contract Closeout

1.03 PRODUCTS LIST

A. Within 10 working days after award of Contract, submit to Architect five copies of complete list of major products which are proposed for installation.

B. Tabulate products by Specification Section number and title.

C. For products specified only by reference standards, list for each such product:

1. Name and address of manufacturer.

2. Trade name.

3. Model or catalog designation.

4. Manufacturer's data:

a. Reference standards

b. Performance test data

c. Guarantee

1.04 CONSTRUCTION MANAGER'S OPTIONS

A. For products specified by reference standards, select any product meeting the standards.

B. For a product specified by naming more than one trade name or manufacturer, select any one of those products and manufacturers.

C. For a product specified as "or equal" to a named product, submit a request for approval of the equivalent product.

D. For a product specified by naming only one trade name and manufacturer, no option and no substitution will be allowed.

1.05 SUBSTITUTIONS

A. Within a period of 10 working days after award of Contract, Architect will consider formal requests from Construction Manager for substitution of products in place of those specified.

1. After that period, requests will be considered only in case of product availability or other conditions beyond the control of the Construction Manager.

2. Failure to order materials in a timely fashion as a means to avoid specification requirements is not acceptable. When a particular material or product is not available, Construction Manager will be called upon to prove the timeliness of orders by providing appropriate documentation. If Construction Manager cannot provide such documentation, he shall provide original product and pay extra shipping charges and/or expediting costs or provide alternative product specified by Owner or Architect regardless of cost.

B. Submit separate request for such substitution. Support each request with:

1. Complete data substantiating compliance of proposed substitution with requirements stated in Contract Documents:

a. Product identification, including manufacturers' name and address.

b. Manufacturers' literature; identify:

1) Product description.

2) Reference standards.

3) Performance and test data.

4) Guarantee

c. Samples, as applicable.

d. Name and address of similar projects on which product has been used, and date of each installation.

2. Itemized comparison of the proposed substitution with product specified; list significant variations.

3. Data relating to changes in construction schedule.

4. Any effect of substitution on separate contracts.

5. List of changes required in other work or products.

6. Accurate cost data comparing proposed substitution with product specified.

a. Amount of any net change to Contract Sum.

7. Designation of required license fees or royalties.

8. Designation of availability of maintenance services, sources or replacement materials.

C. Substitute products shall not be ordered or installed without written acceptance of the Architect.

D. Architect will determine acceptability of proposed substitutions.

E. Substitutions will not be considered for acceptance when:

1. They are indicated or implied on shop drawings or product data submittals without a formal request from the Construction Manager.

2. They are requested directly by a subcontractor or supplier.

3. Acceptance will require substantial revision of Contract Documents.

1.06 CONSTRUCTION MANAGER'S REPRESENTATION

A. Construction Manager shall be solely responsible for scheduling of proposed substitutions and the Work. The process of evaluating proposed substitutions may be time consuming, and not all proposed substitutions will necessarily be granted. No extension of Contract Time will be granted owing to untimely submission, review, or rejection of any proposed substitution.

B. In making formal request for substitution, the Construction Manager represents that:

1. He has investigated proposed product and has determined that it is equal or superior in all respects to that specified.

2. He will provide same warranties or bonds for substitution as for product specified.

3. He will coordinate installation of accepted substitution into the Work, and will make such changes as may be required for the Work to be complete in all respects.

4. He waives claims for additional costs caused by substitution which may subsequently become apparent.

5. Cost data is complete and includes related costs under his Contract, but not:

a. Costs under separate contracts.

b. Architect's costs for redesign or revision of Contract Documents.

1.07 ARCHITECT'S DUTIES

A. Review Construction Manager's requests for substitutions with reasonable promptness.

B. Notify Construction Manager, in writing, of decision to accept or reject requested substitution.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01700

CONTRACT CLOSEOUT

PART 1 - GENERAL

1.01 REQUIREMENTS INCLUDED

A. This section describes contract closeout procedures, including:

1. Substantial completion and Construction Manager's punch list.
2. Final cleaning.
3. Closeout punch list and submittals.
4. Project record documents.
5. Material and finish data.
6. Operation and maintenance data.
7. Systems demonstration.
8. Warranties and guarantees.
9. Certificates of Inspection/sign off with governing authorities.
10. Final payment.

B. Construction Manager is also required to coordinate his efforts with regard to project closeout with the Owner and Architect.

1.02 RELATED REQUIREMENTS

A. Conditions of the Contract.

B. Section 01010: Summary of Work

C. Section 01340: Submittals

D. Section 01500: Construction Facilities and Temporary Controls

E. Section 01710: Cleaning

F. Section 01730: Operations and Maintenance Data

G. Section 01740: Warranties and Bonds

1.03 SUBSTANTIAL COMPLETION

A. When Construction Manager considers the Work is substantially complete, he shall submit written notice, with a list prepared by the Construction Manager of punch items having been completed or corrected.

1. The Architect will not review the project until Construction Manager submits sufficient evidence to indicate that punch list has been completed and Substantial Completion has in fact been obtained.

2. In no case shall the Construction Manager claim Substantial Completion or request inspections to determine Substantial Completion until the required inspections are made, and certificates affirming compliance are issued by all authorities and agencies having jurisdiction, for all Work, and installations thereof.

3. Certificates shall be delivered to the Architect before the review for Substantial Completion.

B. Within a reasonable time, Architect will review to determine status of completion.

C. Should Architect determine that Work is not substantially complete he will so notify Construction Manager.

1. Construction Manager shall remedy deficiencies and send a second written notice of substantial completion; Architect will again review the Work.

2. Construction Manager shall pay for Architect's time and direct expenses where more than two substantial completion reviews are required.

D. When Architect determines that Work is substantially complete, he will prepare a Certificate of Substantial Completion in accordance with General Conditions.

1.04 FINAL CLEANING

A. Execute final cleaning prior to closeout punch list.

B. Clean surfaces exposed to view; remove temporary labels, stains and foreign substances; polish transparent and glossy surfaces; vacuum carpeted and soft surfaces. Clean equipment and fixtures to a sanitary condition; clean or replace filters of mechanical equipment.

C. Remove waste and surplus materials, rubbish, and construction facilities from the Project and from the site.

D. Use only those cleaning materials which will not create hazards to health or property and which do not damage finished surfaces.

1.05 CLOSEOUT PUNCH LIST

A. Upon receipt of written notice that the Work is ready for final review and acceptance, Owner and Architect will review the Project and issue a list of deficiencies or corrections required.

B. One copy of this Closeout List indicating any additional corrections will be forwarded to Construction Manager, Owner, and a copy will be retained by Architect.

C. Construction Manager shall correct all deficiencies forthwith and shall note all corrections and the date made upon the List. Construction Manager shall submit completed list to Architect.

D. Within a reasonable time, Owner and Architect will review the Work to verify that the punch list items have been completed.

1. Should the Architect determine that all the List items have not been completed, he shall notify the Construction Manager of deficiencies.

2. Construction Manager shall pay for Architect's time and direct expenses where more than two final site reviews are required.

1.06 PROJECT CLOSEOUT SUBMITTALS

A. Prior to final payment, and before the Architect issues a final Certificate for Payment in accordance with the General Conditions, the following shall be submitted to the Architect for the Owner:

1. Release or Waiver of Liens as required by General Conditions.

2. Record Documents.

3. Material and finish data

4. Operation and maintenance manuals.

5. Certificates of inspection for compliance with requirements of governing authorities and for final sign off of the work as required.

6. Guarantees and warranties as required by the Contract Documents.

1.07 PROJECT RECORD DOCUMENTS

A. In addition to any other drawing sets, Construction Manager shall keep on the job one record set of black line prints of the Drawings. When any of the work is installed differently from, or in a location other than, that shown on the Contract Drawings, Construction Manager shall note such variations on this record set.

B. Keep documents current; do not permanently conceal any work until required information has been recorded.

C. Upon completion of the work, Construction Manager shall obtain a set of reproducibles from the Architect at cost, and he shall incorporate thereon all changes as noted on the record set of prints. All changes shall be neatly and legibly drawn to scale on the set of reproducibles using standard architectural or engineering drafting practices.

D. At Contract closeout, submit documents with transmittal letter containing date, Project Title, Construction Manager's name and address, list of documents, and signature of Construction Manager.

1.08 MATERIAL AND FINISH DATA

A. Provide data for primary materials and finishes.

B. Submit two sets prior to final inspection, bound in 8 1/2 x 11 inch three ring binders with durable plastic covers.

C. Arrange by specification division and give names, addresses, and telephone numbers of subcontractors and suppliers. List:

1. Trade names.

2. Model or type numbers.

3. Cleaning instructions.

4. Product data.

5. Warranties.

1.09 OPERATION AND MAINTENANCE DATA

A. Provide data for:

1. Mechanical equipment and controls.

2. Electrical equipment and controls .

3. Appliances.

B. Submit two sets prior to final inspection, bound in 8 1/2 x 11 inch three ring binders with durable plastic covers.

C. Provide a separate volume for each system, with a table of contents and index tabs for each volume.

D. Arrange by specification division and give names, addresses, and telephone numbers of subcontractors and suppliers. Provide the following:

1. Appropriate design criteria.

2. List of equipment.

3. Parts list.

4. Operating instructions.

5. Maintenance instructions for equipment and finishes.

6. Shop drawings and product data.

7. Warranties.

1.10 SYSTEMS DEMONSTRATIONS

A. Prior to final inspection, demonstrate operation of each system as required under various sections of the specifications to maintenance personnel.

B. Instruct maintenance personnel in operation, adjustment, and maintenance of equipment and systems, using the operation and maintenance data as the basis of instruction.

1.11 EXTRA MATERIALS

A. Deliver to the Owner all those extra materials which are specifically required under various sections of the Specifications.

1.12 GUARANTEES AND WARRANTIES

A. The Construction Manager is responsible to remedy defects due to faulty workmanship and materials which appear within one year from the date of acceptance in accordance with the General Conditions. Guarantees for more than one year, where indicated in various sections of the Specifications, shall be in the form of a guarantee written on the letterhead of the Construction Manager, subcontractor, or supplier doing the work and/or supplying the item to be guaranteed, as follows:

GUARANTEE WARRANTY FOR _____.
We hereby warrant and the Construction Manager, subcontractor and/or material manufacturer guarantee that the _____ which we have installed in _____, has been done in accordance with the Drawings and Specifications and that the work as installed will fulfill the requirements of the guaranty warranty included in the Specifications. We agree to repair or replace any or all of our work, together with any other adjacent work which may be displaced by so doing, that may prove to be defective in its workmanship or material within a period of _____ years from the date of acceptance of the above named project by the Owner, without any expense whatsoever to the Owner, ordinary wear and tear and unusual abuse or neglect excepted.

In the event of our failure to comply with the above mentioned conditions within thirty days after being notified in writing by the Owner, we collectively or separately do hereby authorize the Owner to proceed to have said defects repaired and made good at our expense, and we will honor and pay the costs and charges therefor upon demand.

Signed _____
Subcontractor

Countersigned _____
Construction Manager

_____
Material Manufacturer

B. Rejection of Warranties: Owner reserves right to reject unsolicited and coincidental product warranties which detract from or confuse interpretations of Contract Documents.

C. Provide duplicate copies, on Construction Manager's or manufacturer's letterhead. Execute Construction Manager's submittals and assemble documents by subcontractors, suppliers, and manufacturers. Provide table of contents and assemble in binder with durable plastic cover.

D. Submit material prior to final application for payment. For equipment put into use with Owner's permission during construction, submit within ten days after first operation. For items of Work delayed materially beyond Date of Substantial Completion, provide updated submittal within ten days after acceptance, listing date of acceptance as start of warranty period.

E. Warranties are intended to protect Owner against failure of work and against deficient, defective and faulty materials and workmanship, regardless of sources.

F. Limitations: Warranties are not intended to cover failures which result from the following:

1. Unusual or abnormal phenomena of the elements.

2. Owner's misuse, maltreatment or improper maintenance of work.

3. Vandalism after substantial completion.

4. Insurrection or acts of aggression, including war.

G. Related Damages and Losses: Remove and replace work which is damaged as result of failure, or which must be removed and replaced to provide access for correction of warranted work.

H. Warranty Reinstatement: After correction of warranted work, reinstate warranty for corrected work to date of original warranty expiration, but not less than half original warranty period.

I. Replacement Cost: Replace or restore failing warranted items without regard to anticipated useful service lives.

1.13 CERTIFICATES OF INSPECTION

A. Construction Manager shall coordinate with subcontractor to obtain evidence of compliance with requirements of governing authorities, with jurisdiction.

B. Submit certificates of inspection necessary for final sign off and certificates of occupancy of the work.

1.14 FINAL PAYMENT

A. When Construction Manager considers Work is complete, submit written certification that:

1. Work has been inspected for compliance with Contract Documents.

2. Work has been completed in accordance with Contract Documents and deficiencies listed with Certificate of Substantial Completion have been corrected.

3. Equipment and systems have been tested in presence of Owner's representative and are operational.

4. Work is complete and ready for final inspection.

B. In addition to submittals required by the Conditions of the Contract, provide submittals required by governing authorities, including Certificate of Occupancy and Certificates of Inspection, and submit a final statement of accounting giving total adjusted Contract Sum, previous payments, and sum remaining due (final Application for Payment).

C. When Architect finds Work is acceptable and final submittals are complete, he will issue a final Certificate for Payment.

PART 2 - PRODUCTS (NOT APPLICABLE)

PART 1 - EXECUTION (NOT APPLICABLE)

END OF SECTION

SECTION 01710

CLEANING

PART 1 - GENERAL

1.01 REQUIREMENTS INCLUDED

A. Execute cleaning, during progress of the Work on a regular basis, and at completion of the Work, as required by General Conditions.

1.02 RELATED REQUIREMENTS

A. Conditions of the Contract.

B. Cleaning for specific products or work of the respective specification sections.

1.03 DISPOSAL REQUIREMENTS

A. Trash/Rubbish disposal is the responsibility of the Contractor.

B. Conduct cleaning and disposal operations to comply with codes, ordinances, regulations, and anti-pollution laws.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Use only those cleaning materials which will not create hazards to health or property and which do not damage surfaces.

B. Use only those cleaning materials and methods recommended by manufacturer of the surface material to be cleaned.

C. Use cleaning materials only on surfaces recommended by cleaning material manufacturer.

PART 3 - EXECUTION

3.01 CLEANING DURING CONSTRUCTION

A. Execute periodic cleaning to keep the Work free from accumulations of waste materials, rubbish and windblown debris, resulting from construction operations.

B. Provide on-site containers for the collection of waste materials, debris and rubbish.

C. Remove waste materials, debris and rubbish from the site periodically and dispose of at legal disposal areas away from the site.

3.02 DUST CONTROL

A. Clean interior spaces thoroughly prior to the start of painting and the application of finishes. Continue cleaning on an as-needed basis until painting is finished.

B. Schedule operations so that dust and other contaminants resulting from cleaning process will not fall on wet or newly-painted surfaces.

3.03 FINAL CLEANING

A. Employ skilled workmen for final cleaning.

B. Remove grease, mastic, adhesives, dust, dirt, stains, fingerprints, labels, and other foreign materials from finishes exposed to view.

C. Wash and shine glazing and mirrors.

D. Polish glossy surfaces to a clear shine.

E. Ventilating System as provided under this Contract.

1. Clean permanent filters and replace disposable filters if units were operated during construction.

2. Clean ducts, blowers and coils if units were operated without filters during construction.

F. Vacuum clean finished floor and wall surfaces as required, broom clean other surfaces or grounds.

G. Prior to final completion or Owner occupancy, Construction Manager shall conduct an inspection of sight-exposed interior surfaces and all work areas to verify that the Work of this Contract is clean.

END OF SECTION

SECTION 01720

PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.01 REQUIREMENTS INCLUDED

A. The Construction Manager shall maintain at the site one record copy of:

1. Drawings
2. Specifications
3. Addenda
4. Change Orders and other modifications to the Contract.
5. Architect's field orders or written instructions.
6. Final shop drawings, product data and samples.

1.02 RELATED REQUIREMENTS

A. Section 01340: Submittals

1.03 MAINTENANCE OF DOCUMENTS AND SAMPLES

A. Store documents and samples in Construction Manager's field office apart from documents used for construction.

1. Provide files and racks for storage documents.
2. Provide locked cabinet or secure storage space for storage of samples.

B. File documents and samples in accordance with CSI 16-Division format.

C. Maintain documents in a clean, dry, legible condition and in good order. Do not use record documents for construction purposes.

D. Make documents and samples available at all times for inspection by Architect.

1.04 MARKING DEVICES

A. Provide felt tip marking pens for recording information in the color code designated by Architect.

1.05 RECORDING

A. Label each document "PROJECT RECORD" in neat large printed Letters.

B. Record information concurrently with construction progress.

1. Do not conceal any work until required information is recorded.

C. Legibly mark drawings to record actual construction:

1. Location of internal utilities and appurtenances concealed in the construction, referenced to visible and accessible features of the structure.

2. Field changes of dimension and detail.

3. Changes made by Field Order or by Change Order.

4. Details not on original contract drawings.

D. Specifications and Addenda: Legibly mark each section to record:

1. Manufacturer, trade name, catalog number, and supplier of each product and item of equipment actually installed.

2. Changes made by Field Order or by Change Order.

1.06 SUBMITTAL

A. At Contract close-out, deliver Record Documents to Architect for Owner.

B. Accompany submittal with transmittal letter in duplicate, containing:

1. Date

2. Project title and number

3. Construction Manager's name and address

4. Title and number of each Record Document

5. Signature of Construction Manager or his authorized representative.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01730

OPERATING AND MAINTENANCE DATA

PART 1 - GENERAL

1.01 REQUIREMENTS INCLUDED

A. The Construction Manager shall compile product data and related information appropriate for Owner's maintenance and operation of products furnished under Contract.

1. Prepare operating and maintenance data as specified in this section and as referenced in other pertinent specification sections.

B. Instruct or arrange instructions for Owner's personnel in maintenance of products and in operation of equipment and systems.

1.02 RELATED REQUIREMENTS

A. Section 01340: Submittals of shop drawings, product data and samples.

B. Section 01700: Contract Closeout.

C. Section 01720: Project Record Documents.

D. Section 01740: Warranties and Bonds.

E. Refer to Mechanical and Electrical Drawings

1.03 QUALITY ASSURANCE

A. Preparation of data shall be done by personnel:

1. Trained and experienced in maintenance and operation of described products.

2. Familiar with requirements of this section.

3. Skilled as technical writer to the extent required to communicate essential data.

4. Skilled as director competent to prepare required drawings.

1.04 FORM OF SUBMITTALS

A. Prepare data in form of an instructional manual for use by Owner's personnel.

B. Format:

1. Size: 8½ in. x 11 in.

2. Paper: 20-pound minimum, white, for typed pages.

3. Text: Manufacturer's printed data, or neatly typewritten description.

4. Drawings:

   a. Provide reinforced punched binder tab; bind in with text.

   b. Fold larger drawings to size of text pages.

5. Provide fly-leaf for each separate product, or each piece of operating equipment.

   a. Provide typed description of product, and major component parts of equipment.

6. Cover: Identify each volume with typed or printed title "OPERATING AND MAINTENANCE INSTRUCTIONS". List:

   a. Title of Project

   b. *Identity of separate structure as applicable*

   c. Identity of general subject matter covered in the manual.

C. Binders:

1. Commercial quality three-ring binders with durable and cleanable plastic covers.

2. Maximum ring size: one inch.

3. When multiple binders are used, correlate the data into related consistent groupings.

1.05 CONTENT OF MANUAL

A. Neatly typewritten table of contents for each volume, arranged in systematic order, in the same order as specification sections.

1. Contractor, name of responsible principal, address and telephone number.

2. A list of each product required to be included, indexed to content of the volume.

3. List, with each product, the name, address and telephone number of:

   a. Subcontractor or installer

   b. Maintenance contractor, as appropriate

   c. Identify area of responsibility of each

   d. Local source of supply for parts and replacement

4. Identify each product by product name and other identifying symbols as set forth in Contract Documents.

B. Product Data:

1. Include only those sheets which are pertinent to the specific product.

2. *Annotate each sheet to:*

   a. Clearly identify specific product or part installed.

   b. Clearly identify data applicable to installation.

   c. Delete references to inapplicable information.

C. Drawings:

1. Supplemental product data with drawings as necessary to clearly illustrate:

   a. Relations of component parts of equipment and systems.

   b. Control and flow diagrams.

2. Coordinate drawings with information in Project Record Documents to assure correct illustration of completed installation.

3. Do not use Project Documents as maintenance drawings.

D. Written text, as required to supplement product data for the particular installation:

1. Organize in consistent format under separate headings for different procedures.

2. Provide logical sequence of instructions for each procedure.

E. Copy of each warranty, bond and service contract issued.

1. Provide information sheet for Owner's personnel, give:

   a. Proper procedures in event of failure

   b. Instances which might affect validity of warranties or bonds.

1.06 MANUAL FOR MATERIALS AND FINISHES

A. Submit two copies of complete manual in final form.

B. Content, for architectural products, applied materials and finishes:

1. Manufacturer's data, giving full information on products.

   a. Catalog number, size, composition

   b. Color and texture designations

   c. Information required for re-ordering special manufactured products

C. Content, for moisture-protection and weather-exposed products;

1. Manufacturer's data, giving full information on products.

   a. Applicable standards

   b. Chemical composition

   c. Details of installation

2. Instructions for inspection, maintenance, and repair.

D. Additional requirements for maintenance data: Respective specification sections.

E. Provide complete information on materials and finishes for products specified in each applicable specification section.

1.07 MANUAL FOR EQUIPMENT AND SYSTEMS

A. Submit three copies of complete manual in final form.

B. Content, for each unit of equipment and system, as appropriate:

1. Description of unit and component parts:

a. Function, normal operating characteristics, and limiting conditions.

b. Performance curves, engineering data and tests

c. Complete nomenclature and commercial number of replaceable parts.

2. Operating procedures:

a. Start-up, break-in, routine and normal operating instructions.

b. Regulation, control, stopping, shut-down and emergency instructions.

c. Summer and winter operating instructions.

d. Special operating instructions.

3. Maintenance procedures:

a. Routine operations

b. Guide to "trouble-shooting"

c. Disassembly, repair and reassembly

d. Alignment, adjusting and checking

4. Servicing and lubrication schedule.

a. List of lubrication schedule.

5. Manufacturer's printed operating and maintenance instructions.

6. *Description of sequence of operation by control manufacturer.*

7. Original manufacturer's parts list, illustrations, assembly drawings and diagrams required for maintenance.

a. Predicted life of parts subject to wear.

b. Items recommended to be stocked as spare parts.

8. As-installed control diagrams by controls manufacturer.

9. Each subcontractor's coordination drawings.

a. As-installed color coded piping diagrams.

10. Charts of valve tag numbers, with location and function of each valve.

11. List of original manufacturer's spare parts, manufacturer's current prices, and recommended quantities to be maintained in storage.

12. Other data as required under pertinent sections of specifications.

C. Content, for each electric and electronic system, as appropriate:

1. Description of system and component parts:

a. Function, normal operating characteristics, and limiting conditions.

b. Performance curves, engineering data and tests.

c. Complete nomenclature and commercial number of replaceable parts.

2. Circuit directories of panelboards.

a. Electrical service

b. Controls

c. Communications

3. As-installed color coded wiring diagrams.

4. Operating procedures:

a. Routine and normal operating instruction

b. Sequences required

c. Special operating instructions

5. Maintenance procedures:

a. Routing operations

b. Guide to "trouble-shooting"

c. Disassembly, repair and reassembly

d. Adjustment and checking

6. Manufacturer's printed operating and maintenance instructions.

7. List of original manufacturer's spare parts, manufacturer's current prices, and recommended quantities to be maintained in storage.

8. Other data as required under pertinent specification sections.

D. Prepare and include additional data when the need for such data becomes apparent during instruction of Owner's personnel.

E. Provide complete information on equipment and systems specified in each applicable specification section.

1.08 SUBMITTAL SCHEDULE

A. Submit two copies of preliminary draft of proposed formats and outlines of contents prior to start of work.

1. Architect will review draft and return one copy with comments.

B. Submit one copy of completed data in final form fifteen days prior to final inspection or acceptance.

1. Copy will be returned after final inspection or acceptance, with comments.

C. Submit specified number of copies of approved data in final form thirty (30) days after final inspection or acceptance.

1.09 INSTRUCTION OF OWNER'S PERSONNEL

A. Prior to final inspection or acceptance, fully instruct Owner's designated operating and maintenance personnel in operation, adjustment and maintenance of products, equipment and systems.

B. Operating and maintenance manual shall constitute the basis of instruction.

1. Review contents of manual with personnel in full detail to explain all aspects of operations and maintenance.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01740

WARRANTIES AND BONDS

PART 1 - GENERAL

1.01 REQUIREMENTS INCLUDED

A. Compile specified warranties and bonds.

B. Compile specified service and maintenance contracts.

C. Co-execute submittals when so specified.

D. Review submittals to verify compliance with Contract Documents.

E. Submit to Architect for review and transmittal to Owner.

1.02 RELATED REQUIREMENTS

A. Conditions of the Contract: General Warranty of Construction.

B. Section 01700: Contract Closeout

C. Section 01730: Operating and Maintenance Data.

D. Each respective specification section requiring warranties and bonds for specific products.

1.03 SUBMITTAL REQUIREMENTS

A. Assemble warranties, bonds and service and maintenance contracts, executed by each of the respective manufacturers, suppliers, and subcontractors.

B. Number of original signed copies required: Two each.

C. Table of Contents: Neatly typed, in orderly sequence. Provide complete information for each item.

1. Product or work item

2. Firm, with name of principal, address and telephone number

3. Scope

4. Date of beginning of warranty, bond or service and maintenance contract.

5. Duration of warranty, bond or service maintenance contract.

6. Provide information for Owner's personnel:

   a. Proper procedure in case of failure.

   b. Instances which might affect the validity of warranty or bond.

7. Construction Manager, name of responsible principal, address and telephone number.

1.04 FORM OF SUBMITTALS

A. Prepare in duplicate packets

B. Formats:

1. Size 8½ inch x 11 inch punch sheets for standard 3-ring binder.

   a. Fold larger sheets to fit into binders.

2. Cover: Identify each packet with typed or printed title "WARRANTIES AND BONDS." List:

   a. Title of Project.

   b. Name of Contractor.

C. Binders: Commercial quality, three-ring, with durable and cleanable plastic covers.

1.05 TIME OF SUBMITTALS

A. For equipment or component parts of equipment put into service during progress of construction:

1. Submit documents within 10 days after inspection and acceptance.

B. Otherwise make submittals within ten days after inspection and acceptance.

C. For items of work, where acceptance is delayed materially beyond Date of Substantial Completion, provide updated submittal within ten (10) days after acceptance, listing date of acceptance as start of warranty period.

1.06 SUBMITTALS REQUIRED

A. Submit warranties, bonds, service and maintenance contracts as specified in each applicable specification section.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 02050

SELECTIVE DEMOLITION AND ALTERATIONS WORK

PART 1 - GENERAL

1.01 DESCRIPTION

A. Perform selective demolition, alterations, relocation [where applicable] and related work in accordance with requirements of the Contract Documents to interface with demolition work by Landlord.

B. Coordinate with work performed by related trades, work not in contract (NIC) and/or by the Owner or Landlord to ensure that no alterations work is left undone.

C. Related Work

1. Division 1 - General Requirements as applicable.

2. Cutting and Patching - Section 01045.

3. Lightweight Fill, Flash Patching and Leveling Compound - Section 03320.

4. Mechanical and electrical work - Disconnecting, removal and/or relocation of existing mechanical and electrical work, including equipment, piping, wiring, etc. Refer to Drawings.

D. Not In Contract (NIC)

1. Asbestos Abatement.

2. Work performed by Owner.

3. Work performed by Landlord.

3. Lightweight Fill, Flash Patching and Leveling Compound as required for resilient flooring and carpeting installations.

1.02 SCHEDULING

A. Before commencing any alteration or demolition work, submit for review by the Architect and acceptance by the Owner, a schedule showing the commencement, the order and the completion dates for the various parts of this work.

B. Before starting any work relating to existing utilities (electrical, sewer, water heat, gas, fire lines, etc.) that will temporarily discontinue or disrupt service, notify the Architect and the Owner 48 hours in advance and obtain the Owner's approval in writing before proceeding with this phase of the Work.

1.03 PROTECTION

A. Make such explorations and probes as are necessary to ascertain any required protective measures before proceeding with demolition and removal. Give particular attention to shoring and bracing requirements to prevent any damage to existing construction.

B. Provide, erect and maintain catch platforms, lights, barriers, weather protection, warning signs and other items as required for proper protection of the public, occupants of the building, workmen engaged in demolition operations, and adjacent construction.

C. Provide and maintain temporary protection of the existing structure designated to remain where demolition, removal and new work is being done, connections made, materials handled or equipment moved.

D. Take necessary precautions to prevent dust from rising by wetting demolished debris. Protect unaltered portions of the existing building affected by the operations under this Section by dustproof partitions and other adequate means.

E. Do not close or obstruct walkways, passageways or stairways. Do not store or place materials in passageways, stairs or other means of egress. Conduct operations with minimum traffic interference.

F. Be responsible for any damage to the existing structure or contents by reason of the insufficiency of protection provided.

1.04 WORKMANSHIP

A. Perform demolition, removal and alteration work as shown, with due care, including shoring, bracing, etc. [if any]. Be responsible for damage, which may be caused by such work, to any part or parts of existing structures or items designated for reuse. Perform patching restoration and new work in conjunction with and in accordance with applicable requirements of the respective technical Sections of the Specifications.

B. Materials or items designated to become the property of the Owner shall be as shown. Remove such items with care and store them in a location at the site to be designated by the Owner.

C. Materials or items demolished and not designated to become the property of the Owner or to be reinstalled shall become the property of the Contractor and shall be removed from the Owner's property.

D. Execute work in a careful and orderly manner, with the least possible disturbance to the public and to the occupants of the building.

E. Remove existing finishes in areas designated. Removal shall be complete to original substrate. Patch existing substrates with materials suitable for intended use following manufacturer's instructions. Level substrates, patching to align with existing floor finishes or as required to align with new floor finishes. Where feathering is required, extend work for greatest length possible to prevent sudden transitions in horizontal or vertical surfaces.

F. Where alterations occur, or new and old work join, cut, remove, patch, repair or refinish the adjacent surfaces or so much thereof as is required by the involved conditions, and leave in as good a condition as existed prior to the commencing of the work. The materials and workmanship employed in the alterations, unless otherwise shown or specified, shall comply with that of the original work. Alteration work shall be performed by the various respective trades which normally perform the particular items of work.

G. Finish new and adjacent existing surfaces as specified for new work. Clean existing surfaces of dirt, grease, loose paint, etc. before refinishing.

H. Cut out embedded anchorage and attachment items as required to properly provide for patching and repair of the respective finishes.

I. Patch floor slab and bring levels of floor finish to required tolerances. Coordinate with the applicable provisions of related trades and Section 01045 "Cutting and Patching" and Section 03320 "Lightweight Fill, Flash Patching and Leveling Compound."

1.06 CLEANING UP

A. Remove all debris as the work progresses, and broom sweep on a daily basis. Maintain the premises in a neat and clean condition.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 03320

LIGHTWEIGHT FILL, FLASH PATCHING &

LEVELING COMPOUND

PART 1 - GENERAL

1.01 SUMMARY

A. Work of this Section is governed by General Conditions of the Contract and by provisions contained in Division 0 and Division 1 of these Specifications.

B. Work Included: This Section generally includes but is not limited to the following:

1. Flash patching of existing concrete floors; and/or leveling of existing floors with leveling compound as required for the interior stonework, ceramic tile, and millwork installation to required tolerances specified in the respective trade sections in order to complete the Work.

2. Work Not In Contract (NIC): Flash patching of existing concrete floors; and/or leveling of existing floors with leveling compound as required for the resilient flooring and carpet installation and required tolerances specified in the respective trade sections in order to complete the Work.

3. Use ancillary feathering patching compound when phasing of the work interrupts installation and feathering is required to bridge one phase of installation to another.

4. Concrete sealer/curing agent/hardener of existing concrete floors where indicated or as required by the respective trades to complete their respective Work.

   a. It is intended that all concrete substrates beneath access flooring shall be sealed.

5. Leveling of existing concrete floors with troweled on leveling underlayment as required by Section 09630 "Interior Stonework" to required tolerance in order to complete the Work and ensure proper installation of setting bed materials.

6. Testing of existing concrete floors to determine compressive strength and to ensure suitability of specified self-leveling compound is a requirement of the Work of this Contract.

7. Flash patching of existing concrete floors as required by project conditions; where disturbed by the Work of related trades.

C. Related Work

1. Cutting and patching - Section 01045.

2. Selective demolition and alterations work - Section 02050.

3. Architectural woodwork - Section 06400.

4. Tile work - Section 09300.

5. Interior Stonework - Section 09630.

6. Access flooring - Section 10270.

D. Work Not In Contract (NIC)

1. Resilient flooring and base covering - Section 09650.

2. Carpeting -Section 09680.

1.02 SUBMITTALS

A. Submit product data for each type of product used.

B. Submit verification of VOC/VOS compliance for each type of product used required to be compliant.

1.03 DELIVERY, STORAGE AND HANDLING

A. Protect materials delivered to site from deterioration and damage from moisture, temperature change, contamination, corrosion and other causes.

PART 2 - PRODUCTS

2.02 CURING COMPOUND/HARDENER/SEALER

A. Liquid surface coating shall be Building Standard. Where there is not a building standard, provide liquid surface coating as manufactured by The Anti-Hydro Company or approved equal; suitable to the existing substrate and the use intended; compatible with related trades.

2.03 FLASH PATCHING

A. Cement or latex compound, pre-mixed or site-mixed with potable water, to produce a liquid materials to achieve the following:

1. Correction of floor levels would affect work of other trades including but not limited to finish flooring materials, architectural woodwork and furnishings.

2. Float over cracks in concrete slabs, whether caused by temperature stress or structural frame movement, existing at the time of commencing this work.

3. Provide sloped transitions between substrate levels at floor finish materials such as carpet-to-resilient tile, carpet or resilient tile-to-ceramic/stone flooring and other conditions requiring isolated slopes to bring adjacent or abutting floor materials to indicated lines. Verify acceptability of degree of sloped transitions with Architect.

B. Acceptable manufacturer:

1. ARDEX, Inc., Type as required depending on site conditions encountered; or equivalent product of A.R. Bonsal Co.

2. Where aggregate is required to provide maximum thickness, provide material recommended by manufacturers.

2.03 LEVELING COMPOUND

A. Cementitious, self-smoothing, self-leveling floor compound, achieving minimum of 4200 psi at 28 days when tested in accordance with ASTM C-109.

B. Acceptable manufacturer:

1. Underlayment: "Ultra/Plan" [for featheredge to 1/2" per pour] or "Ultra/Plan MB" [3/16" to 1" per pour] as manufactured by Mapei Corp.

2. Primer: "Primer U.P." liquid polymer and dry as manufactured by Mapei Corp.

2.04 LEVELING COMPOUND - STONE FLOORING INSTALLATION

A. Portland cement-based, underlayment leveling compound, pre-mixed or site-mixed with potable water, to produce a liquid materials to achieve the following:

1. Correction of floor levels which would affect work Section 09630 "Interior Stonework".

2. Achieve an underlayment compressive strength of 2630 PSI at one day and 4100 psi at 28 days per ASTM C109/mod.

3. Where aggregate is required to provide maximum thickness, provide material recommended by manufacturer.

B. Acceptable products/manufacturer:

1. Laticrete 226 thick bed mortar mix with 3701 latex admix as manufactured by Laticrete International, Inc.

PART 3 - EXECUTION

3.01 INSPECTION

A. Examine substrates on which leveling compound will be installed and conditions under which work will be performed. Include testing as necessary to quantify condition of the substrate. Do not proceed with work until unsatisfactory conditions have been corrected in an acceptable manner. Commencing work implies acceptance of existing conditions as satisfactory to successful completion of this work.

B. Remove substances that would interfere with proper bond of mortar or grout joint.

1. Clean existing slab underlayment of all cut-back and related toppings which would interfere with the bonding of the mortar.

2. Clean and prepare slab properly prior to installation. Slab shall be shot blasted or scarified prior to leveling. No dust residue shall remain.

C. Clean all other substrates as required to remove deleterious substances that might impair the work. Scarify surface to ensure bonding of leveling underlayment to existing slab.

3.02 PREPARATION

A. Remove dirt, loose material, oil, grease, paint or other contaminants, leaving a clean surface.

B. When existing slab surface is smooth and unacceptable for good bonding, roughen surface by chipping or scarifying before cleaning.

C. Prior to placing materials, thoroughly dampen slab surface and apply bonding agents as recommended by manufacturer and/or referenced standards.

D. Joints: Mark locations of joints in existing slabs so that joints in toppings will be placed directly over them. Provide other joints as shown on the drawings.

3.03 INSTALLATION OF FLASH PATCHING AND LEVELING COMPOUND

A. Mix (if not pre-mixed) and apply flash patching and leveling compound by a combination of pouring, troweling (or squeegee) onto properly prepared substrate to achieve tolerance specified.

B. Coordinate and set elevation/benchmark for top of leveling compound to achieve required elevations required to match existing stone installation.

C. Protect during curing, maintaining ambient environmental recommendations for temperature, air circulation as well as other conditions which might affect the work.

3.04 PERFORMANCE

A. Failure of materials to bond to substrate as evidenced by a hollow sound when tapped, or disintegration or other failure of materials to perform as a floor finish substrate, will be considered failure of materials and workmanship. Repair or replace materials in areas of such failures as directed.

END OF SECTION

0SECTION 05500

METAL FABRICATIONS

PART 1 - GENERAL

1.01 SUMMARY

A. Work of this Section is governed by General Conditions of the Contract and by provisions contained in Division 0 and Division 1 of these Specifications.

B. Work Included: This Section generally includes the following:

1. Miscellaneous metal items indicated on the drawings.

2. Rough hardware.

3. Miscellaneous steel where indicated and as required for protection of columns and related items of loading dock. Refer to details on Drawings.

4. Miscellaneous angles, supports where indicated and as required.

5. Miscellaneous framing and supports where indicated and as required.

6. Miscellaneous steel required for the work of this Project and not provided under other related sections including Structural.

7. Cutting, drilling, and tapping work of this Section to accommodate work of other Sections and of masonry, concrete and other materials as required for attachment and installing Work of this Section.

8. Prime painting, touch-up painting, galvanizing and separation of dissimilar of metals for work of this Section.

C. Related Work

1. Ornamental Metal - Section 05700.

2. Gypsum board systems - Section 09250.

1.02 REFERENCE STANDARDS

A. American Welding Society (AWS): Structural Welding Code and Recommended Practices for Resistance Welding Practices for Resistance Welding; Code for Welding in Building Construction.

B. American Institute of Steel Construction (AISC).

1.03 QUALITY ASSURANCE

A. Qualifications of Manufacturer: Manufacturers regularly engaged in manufacture of similar items and with not less than 3 years of successful production.

B. Verify dimensions in field prior to fabrication.

C. Shop Assembly: Pre-assemble items in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for re-assembly and coordinated installations.

1.04 SUBMITTALS

A. Product Data: Submit manufacturer's specifications, anchor details and installation instructions for products, including paint and grout.

B. Shop Drawings: Do not fabricate or deliver items to the job site until approval of shop drawings is obtained from the Architect. Shop drawings shall include, but are not limited to, the following information:

1. Gauge, thickness, profiles, sizes, connection attachments, reinforcing and construction for each member.

2. Method of assembling the various members which make up each item.

3. True profiles, connections to adjoining work, methods of anchoring, hardware, size and type of fasteners and accessories.

4. Structural computations, material properties and other information needed for structural analysis.

5. Erection drawings, elevations and details where applicable.

6. Indicate welded connections, using standard AWS welding symbols. Indicate net weld lengths.

1.05 DELIVERY, STORAGE AND HANDLING

A. Tag all items to agree with shop drawing designations.

B. Coordinate with other trades in scheduling delivery and installation.

C. Protect materials delivered to site from deterioration and damage from moisture, temperature change, contamination, corrosion and other causes.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Provide materials which are smooth and free of surface blemishes where exposed to view.

1. Exposed to view surfaces which exhibit pitting, seam marks, roller marks, rolled trade names and roughness are not acceptable.

B. Gauges, thicknesses and weights of metal shall be as indicated on accepted shop drawings and as follows:

1. Gauges for sheet steel and sheet stainless steel shall be U.S. Standard Gauge.

2. For sheet aluminum, brass, bronze and other non-ferrous metals, gauges shall be Brown & Sharpe (B & S).

3. Wire gauges shall be Washburn and Moen (W & M) for steel and stainless steel and B & S for non-ferrous steel.

4. Screws and bolts shall be U.S. Standard.

2.02 FERROUS METALS

A. Steel Plates, Shapes and Bars: ASTM A36.

B. Steel Tubing: Cold formed, ASTM A 500; or hot-rolled, ASTM A501.

C. Structural Steel Sheet: Hot-rolled, ASTM A570; or cold-rolled ASTM A611, Class 1; of grade required for design loading.

D. Galvanized Structural Steel Sheet: ASTM A446, of grade required for design loading. Coating designation G90.

E. Steel Plates for Bending or Cold Forming: ASTM A283, Grade C.

F. Concrete Inserts: Threaded or wedge type; galvanized castings, either malleable iron, ASTM A47, or cast steel, ASTM A27. Provide bolts, washers and shims as required, hot-dip galvanized, ASTM A153.

G. Steel Pipe: ASTM A 53, type and grade as selected by the fabricator and as required for design loading; black finish, standard weight.

2.03 GROUT

A. Metallic Non-Shrink Grout: Pre-mixed, factory-packaged, ferrous aggregate grout.

B. Non-Shrink Non-Metallic Grout: Pre-mixed, factory-packaged, non-staining, non-corrosive, non-gaseous grout, as recommended by manufacturer for applications of type specified.

2.04 FASTENERS

A. General: Provide zinc-coated fasteners where built into exterior walls. Select fasteners for the type, grade and class required.

B. Bolts and Nuts

1. Regular Hexagon: ASTM A307, Grade A.

2. Lag Bolts: Square head type.

3. Toggle Bolts: Tumble-wing type.

C. Screws

1. Machine Screws: Cadmium plated steel.

2. Wood Screws: Flat head steel.

D. Washers

1. Plain Washers: Round steel.

2. Lock Washers: Helical spring type carbon steel.

E. Masonry Anchorage Devices: Expansion shields.

2.05 PAINT

A. Galvanizing Repair Paint: High zinc dust content paint for galvanized steel, complying with SSPC-Paint-20.

2.06 MISCELLANEOUS MATERIALS

A. Welding Electrodes and Filler Metal: Type and alloy to match metal substrate.

B. Wire Brush: Mechanically or hand operated for cleaning wrought iron.

C. Patching Compound: Plumbing epoxy or auto body putty.

2.07 FABRICATION

A. General: Form exposed work true to line and level with accurate angles, surfaces and straight sharp edges. Ease exposed edges to a radius of approximately 1/32", unless otherwise indicated. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.

B. Welding: Weld corners and seams continuously, complying with AWS recommendations. At exposed connections, grind exposed welds smooth and flush to match and blend with adjoining surfaces.

C. Joints: Form exposed connections with hairline joints, flush and smooth, using concealed fasteners wherever possible. Use exposed fasteners of type indicated or, if not indicated, Phillips flat-head (countersunk) screws or bolts.

D. Anchorage: Provide for anchorage of type shown, coordinated with supporting structure. Fabricate and space anchoring devices to provide support for intended use.

E. Cutting: Cut, reinforce, drill and tap miscellaneous metal work as to receive finish hardware and similar items.

F. Galvanizing: Provide a zinc coating for those items shown or specified to be galvanized, as follows:

1. ASTM A153 for galvanizing iron and steel hardware.

2. ASTM A123 for galvanizing rolled, pressed and forged steep shapes, plates, bars and strip 1/8" thick and heavier.

3. ASTM A386 for galvanizing assembled steel products.

2.08 SHOP PRIMING

A. Shop Primer for Ferrous Metal: Provide primer compatible with finish paint systems indicated. Apply primer in compliance with requirements of SSPC-PA1 "Paint Application Specifications No. 1" for shop painting.

1. Manufacturer's or fabricator's standard, fast-curing, lead-free, primer.

B. Surface Preparation: Prepare ferrous metal surfaces to comply with minimum requirements indicated below for SSPC surface preparation specifications and environmental exposure conditions of installed metal fabrications:

1. Exteriors or exposed to moisture (SSPC Zone 1B): SSPC-SP6 "Commercial Blast Cleaning".

2. Interiors (SSPC Zone 1A): SSPC-SP3 "Power Tool Cleaning".

C. Apply shop primer to surfaces of metal fabrications except those which are galvanized or to be embedded in concrete or masonry, unless otherwise indicated.

D. Apply painted finish to metals as specified in Painting Section 09900 "Painting and Finishing".

2.09 ROUGH HARDWARE

A. Furnish custom fabricated bolts, plates, anchors, hangers, dowels and other miscellaneous steel and iron shapes for anchoring and securing woodwork, metalwork and accessories to concrete or other structures.

B. Fabricate items of sizes, shapes and dimensions required. Furnish steel washers.

2.10 MISCELLANEOUS FRAMING AND SUPPORTS

A. Provide miscellaneous steel framing and supports which are not a part of structural steel framework, to complete installations indicated.

B. Fabricate miscellaneous metal units to sizes, shapes and profiles indicated or, if not indicated, of required dimensions to receive work.

1. Except as otherwise shown, fabricate from structural steel shapes and plates and steel bars, of welded construction using mitered joints for field connection. Cut, drill and tap units to receive hardware and similar items.

PART 3 - EXECUTION

3.01 PREPARATION

A. Field Measurements: Take field measurements prior to preparation of shop drawings and fabrication, where possible. Do not delay job progress; allow for trimming and fitting where taking field measurements before fabrication might delay work.

B. Furnish anchorages, setting drawings, diagrams, templates, and directions for installation of anchorages.

1. Anchorages include concrete inserts, sleeves, anchor bolts and miscellaneous items having integral anchors, which are to be embedded in concrete or masonry construction. Coordinate delivery of such items to project site.

3.02 INSTALLATION

A. General: Form metal work to designated shapes and sizes with sharp lines and angles. Shearing and punching shall leave clean, true lines and surfaces.

B. Fastenings

I. Provide rebates, lugs and brackets to permit assembly in a neat, substantial manner. Fastenings shall be concealed where possible; of proper size and type and in sufficient quantity to develop the full strength of the parts being joined and to support and transfer loads safely.

2. Steel: Rivet permanent connections for steel work where practicable. Rivet and bolt heads shall be countersunk flush with surface.

3. Aluminum: Weld permanent connections of aluminum. Riveting may be used only where surfaces are not visible. Brazing, forging or hammer welding is not acceptable.

C. Cutting, Drilling and Fitting

1. Perform cutting, fitting and drilling necessary so that work may be properly set in place to permit engaging work to be properly installed.

2. Furnish screws, bolts and other fastening devices needed for assembling and for attachment to engaging materials so as to avoid unnecessary cutting and drilling. Proper washers shall be included as necessary.

3. Sharp exposed edges shall be filed or ground smooth and round and free from burrs.

D. Welding

1. Perform welding operations in accordance with the requirements of the American Welding Institute.

2. Welding shall be either oxyacetylene or electric arc process.

3. Use only certified/licensed welders.

4. Wherever possible, welding operations and the tensioning of high strength bolt connections shall be done in shop. If such connections must be done in field, the calculated stresses in the welds or bolts shall be less than 50 per cent of basic allowable values

5. Finish exposed joints smooth and flush, practically invisible.

3.03 ADJUST AND CLEAN

A. Touch-Up Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with same material as used for shop painting. Apply by brush or spray to provide a minimum dry film thickness of 2.0 mils.

B. For Galvanized Surfaces: Clean field welds, bolted connections and abraded areas and apply zinc-rich galvanizing repair paint to comply with ASTM A780.

END OF SECTION

SECTION 05700

ORNAMENTAL METAL

PART 1 - GENERAL

1.01 SUMMARY

A. Work of this Section is governed by General Conditions of the Contract and by provisions contained in Division 0 and Division 1 of these Specifications.

B. Work Included: This Section generally includes the following:

1. Coordination of ornamental metal fabrication and finish requirements with the work of related trades to ensure consistency in Project finishes and/or fabrication requirements in their respective work.

2. Stainless steel divider strip at intersection of stone and recessed carpet.

3. Chrome reveal, one inch, polished finish; installed in conjunction with stone wainscot as detailed on the Drawings. Coordinate with Section 09630 "Interior Stonework".

C. Related Work

1. Miscellaneous metal - Section 05500.

2. Tempered glass doors - Section 08450.

3. Interior Stonework - Section 09630.

4. Painting and finishing - Section 09900.

1.02 REFERENCE STANDARDS

A. American Welding Society (AWS): D1-1 Structural Welding Code

B. National Association of Architectural Metal Manufacturers (NAAMM) Metal Finishes Manual.

1.03 SUBMITTALS

A. Product Data: Submit manufacturer's, fabricator's and finisher's specifications and installation instructions for each product.

B. Shop Drawings: Submit shop drawings for fabrication and installation of each type of pipe screen. Include plans, elevations and detail sections.

1. Indicate materials, methods, types of joinery, fasteners, anchorages and accessory items; specify finishes.

2. Provide setting diagrams and templates for anchorages, sleeves, and bolts installed by others.

3. Include structural computations, material properties and other information needed for substantiation of method of support and bracing. Computations shall be prepared and signed by an engineer licensed in the state of Florida.

C. Samples: Submit 3 samples of each metal, of alloy, thickness and finish to be used for the work. Where normal color and texture variations are to be expected, include 2 or more units in each set of samples showing the limits of such variations. Submit the following:

1. 18" long sample of linear shapes.

2. 6" square sample plates for finish.

3. Samples of clad assemblies inclusive of substrate and fasteners.

1.04 QUALITY ASSURANCE

A. Fabricator/Installer Qualifications: Work shall be fabricated and installed by an experienced firm, engaged in work of equivalent scope and quality standards for at least 5 consecutive years.

B. Shop Assembly: Pre-assemble items in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.

C. Field Measurements: Take field measurements prior to preparation of shop drawings and fabrication, where possible, to ensure proper fitting of the work.

1. Where taking of field measurements before fabrication might delay the work, allow for adjustments and fitting.

1.05 *DELIVERY, STORAGE AND HANDLING*

A. Protect ornamental metalwork and related materials before, during and after installation; protect adjacent materials and installed work.

B. In the event of damage, immediately make repairs and replacements necessary at no additional cost to the Owner.

1.06 COORDINATION

A. Accurately cut, fit, drill and tap metalwork to accommodate and fit work of other trades.

B. Provide anchor bolts, inserts, plates and any other anchorage devices as well as templates and instructions for ornamental metal work to be built into work of other trades.

1. Materials shall be provided so not to delay job progress schedule.

PART 2 - PRODUCTS

2.01 MATERIALS

A. General: Provide materials which exhibit surface flatness, smooth and free from blemishes where exposed to view in finished units.

1. Exposed to view surfaces which exhibit pitting, seam marks, roller marks, "oil-canning", stains, discolorations or other imperfections are not acceptable.

B. Stainless Steel:

1. Type: ASTM A167; AISI Type 302/304, unless otherwise indicated. Sheet shall be cold-rolled; minimum thickness .050" or as required to ensure smooth surfaces free of waves, buckling, telegraphing of substrate, bowing and other surface imperfections. Material and finish shall match Architect's control sample.

2. Bar Stock: ASTM A276.

3. Plate: ASTM A167.

4. Tubing: ASTM A269.

C. Steel (carbon):

1. Structural Shapes: ASTM A36.

2. Plates (for forming or bending cold): ASTM A283, Grade C.

3. Steel Sheets: ASTM A245, Grade C.

4. Steel Pipe: ASTM A53, type and grade as recommended by fabricator for design loading; standard weight (schedule 40).

5. Shop prime with rust inhibitive primer compatible with finish painting.

D. Welding Electrodes and Filler Metal: Type and alloy of filler metal and electrodes as recommended by producer of the metal to be welded, and to match color, strength and compatibility of the fabricated items.

E. Fasteners: Furnish basic metal and alloy, matching finished color and texture as the metal being fastened, unless otherwise indicated. Fasteners shall be concealed except where indicated on final shop drawings or when acceptable to the Architect.

1. Where exposed fasteners are acceptable to the Architect, provide countersunk Phillips flat-head screws, unless otherwise indicated.

F. Anchors and Inserts: Furnish inserts to be set in concrete, and anchoring devices for use in masonry, stone or wood, for the attachment of ornamental metal items to indicated substrates.

1. Toothed steel or lead shield expansion bolt devices for drilled-in-place anchors.

2. Galvanized or cadmium-coated anchors and inserts for installations exposed to moisture.

3. Provide units with exposed surfaces matching the texture and finish of the metal item anchored.

G. Bituminous Paint: SSPC-Paint 12 (cold-applied asphalt mastic).

2.02 FABRICATION - GENERAL

A. Shopform metalwork to the required shapes and sizes, with true curves, lines and angles. Provide necessary rabbets, lugs and brackets for assembly of

units. Use concealed fasteners wherever possible; exposed fasteners shall occur only where permitted by Architect.

B. Joints

1. Locate joints where indicated on drawings.

2. Make connections with joints capable of developing full strength, flush unless otherwise indicated.

3. Fabricate connections to allow for thermal movement of metal, at locations and by methods approved by Architect.

4. Joints shall be mitered, welded and ground smooth unless otherwise noted.

C. Welding: Comply with AWS for recommended shop welding practices.

1. Welds shall be continuous, except where spot welding is specifically permitted.

2. Provide welds behind finished surfaces without distortion or discoloration of exposed side.

3. Undercut metal edges where welds are required to be ground flush.

4. Clean exposed welded joints of welding flux, dress smooth exposed and contact surfaces and finish to match adjacent specified metal finish.

D. Bolts and Screws

1. Make threaded connections tight with threads entirely concealed; use lock nuts.

2. Bolts and screw heads, where shown to be exposed to view, shall be flat and countersunk.

3. Cut off projecting ends of exposed bolts and screws flush with nuts of adjacent metal.

E. Cutting

1. Cut metal by sawing, shearing or blanking. Flame cutting will be permitted only if cut edges are ground back to clean, smooth edges.

2. Make cuts accurate, clean, sharp, square and free of burrs, without deforming adjacent surfaces or metals.

F. Holes: Drill or cleanly punch holes (do not burn), so that holes will be accurate, clean, neat and sharp without deforming adjacent surfaces or metals.

G. Supplementary Parts: Provide as necessary to complete each item or work, even though such supplementary parts are not shown or specified.

2.03 SHOP FINISHING

A. Apply shop finishes to exposed surfaces of all work of this Section as required. Coordinate with the applicable requirements of Section 09900 "Painting and Finishing" when applicable.

B. General

1. Comply with NAAMM "Metal Finishes Manual" for finish designations and application recommendations, except as otherwise indicated.

2. Provide colors or color matches as indicated on selected samples.

3. Protect mechanical finishes on exposed surfaces from damage by application of strippable temporary protective covering prior to shipment.

4. Corrosion Protection: Coat concealed surfaces which will be in contact with concrete, masonry, wood or dissimilar metals, in work in contact with moisture, with a heavy coat of bituminous paint. Do not extend coating onto exposed surfaces.

2.04 FABRICATED ITEMS

A. Fabricate to produce uniform lines; maintaining profile of member throughout.

B. Fabricate to comply with required performance of item.

C. Maintain profile of member throughout without deformation.

D. Fabricate to comply with required structural performance.

E. Allow for thermal movement.

PART 3 - EXECUTION

3.01 INSPECTION

A. Examine the areas and conditions where ornamental metal work is to be installed and notify the Architect of conditions detrimental to the completion of the work.

B. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

3.02 INSTALLATION

A. General: Install work square, plumb, straight, true to line or radius, accurately fitted and located, measured from established lines and levels. Unless otherwise indicated, provide flush, tight hairline joints; allow for thermal movement.

1. Perform cutting, drilling and fitting required for the installation of the ornamental metal items.

2. Where the shop fabricated metal items do not fit field conditions, return the item to the shop for correction.

3. Make provisions for other trades and install work to exclude moisture. Use specified attachment devices for secure and rigid installation.

4. Install concealed gaskets and joint fillers as the work progresses, so as to make the work soundproof or lightproof as required.

B. Tolerances

1. 1/16" offset from true horizontal, vertical and design location.

2. 1/32" offset from true alignment between abutting components.

C. Joints: Form joints with exposed connections accurately fitted with uniform reveals and spaces for sealants and joint fillers. Where cutting, welding and grinding are required for proper shop fitting and jointing of work, restore finishes to eliminate any evidence of such corrective work.

D. Field Welding: Comply with AWS Code for the procedures of manual shielded metal arc welding, appearance and quality of welds made, and the methods used in correcting welding work.

3.03 PROTECTION

A. Do not cut or abrade finishes which cannot be completely restored in the field. Return damaged items to the shop for alterations, followed by complete refinishing or provide new units.

B. Retain protective coverings intact and remove simultaneously from similarly finished items to preclude nonuniform oxidation and discoloration.

1. Restore protective coverings which have been damaged during shipment or installation of the work.

C. After installation, remove protective coating and clean exposed surfaces. Provide additional temporary protection until final acceptance.

1. Remove protective coverings only when there is no possibility of damage from other work yet to be performed at the same location.

D. Damaged, stained, discolored, abraded, etc., shall be rejected and replaced with new materials, at no cost to the Owner.

END OF SECTION

SECTION 06100

ROUGH CARPENTRY

PART 1 - GENERAL

1.01 SUMMARY

A. Work of this Section is governed by General Conditions of the Contract and by provisions contained in Division 0 and Division 1 of these Specifications.

B. Work Included: This Section generally includes the following:

1. All items of rough carpentry as indicated and as required.

2. Plywood reinforcement where indicated and as required.

3. Reinforcing in gypsum board partitions (plywood and metal) is provided under Section 09250.

4. Wood grounds, nailers, blocking, furring; and similar items not provided under other sections but required for the work of this Project.

5. Equipment mounting panels.

6. Miscellaneous wood framing as indicated and elsewhere as required.

7. Plywood backboard for telephone closets.

C. Related Work

1. Lightweight fill, flash patching and leveling compound - Section 03320.

2. Miscellaneous Metal - Section 05500.

3. Finish hardware - Section 08700.

4. Gypsum board systems - Section 09250.

6. Miscellaneous specialties - Section 10900.

1.02 REFERENCE STANDARDS

A. Lumber Standards: Comply with PS 20 and with applicable rules of the respective grading and inspecting agencies for species and products used.

B. Plywood Product Standards: Comply with PS 1 (ANSI A 199.1) or, for products not manufactured under PS 1 provisions, with applicable APA Performance Standard for type of panel specified.

1.03 SUBMITTALS

A. Product Data: Submit a minimum of 3 copies of manufacturer's specifications and installation instructions for manufactured materials.

B. Warranty: Submit manufacturer's warranties for the materials specified herein for a period of one year from date of Substantial Completion.

C. Wood Treatment Data: Treat fire retardant wood products specified in this section in accordance with AWPA standards. Submit chemical treatment manufacturer's instructions for handling, storing, and using treated material.

1. Include certification by treating plant stating type of preservative and process used, net amount of preservative retained and conformance with applicable standards.

2. Include statement that moisture content of treated materials was reduced to levels required.

1.04 QUALITY ASSURANCE

A. Provide fire rated rough carpentry as required by code.

B. Inspection agencies and the abbreviation used to reference with lumber grades and species include the following:

1. Southern Pine Inspection Bureau (SPIB).

2. West Coast Lumber Inspection Bureau (WCLIB).

3. Western Wood Products Association (WWPA).

4. Northeastern Lumber Manufacturers Association, Inc. (NLMA).

C. Grade Marks: Identify lumber and plywood by official grade mark. Use lumber factory-marked with grade stamp of inspection agency to show compliance with grading rule requirements and identifying grading agency, grade, species, moisture content at time of surfacing, and mill.

D. Plywood Grading Rules

1. Softwood plywood PS-1.

2. Hardwood plywood PS-51.

3. American Plywood Association (APA).

E. Lumber grading rules and wood species shall be in conformance with PS20.

1.05 PRODUCT HANDLING

A. Keep materials under cover and dry. Protect against exposure to weather and contact with moist surfaces. Stack lumber and plywood; provide for air circulation within and around stacks.

1.06 COORDINATION

A. Fit rough carpentry work to other work; scribe and cope as required for accurate fit. Correlate location of furring, nailers, blocking, grounds and similar supports for attachment of other work.

PART 2 - PRODUCTS

2.01 LUMBER, GENERAL

A. Lumber for bridging, firestopping, blocking, grounds, furring, nailers, etc. shall be construction grade or better.

B. Dimensional Lumber - General: Provide Light Framing Lumber (2" to 4" thick, 2" to 4" wide) and Structural Framing Lumber, including bridging (2" to 4" thick, 2" and wider), of any species and grades listed under WWPA rules, that meet the following minimum criteria or comply with requirements indicated on structural drawings, whichever is more stringent:

1. Fb (minimum extreme fiber stress in bending): 1,400 psi.

2. Fv (minimum horizontal shear force): 190 psi.

3. E (minimum modulus of elasticity): 1,400,000 psi.

C. Nominal sizes are indicated, except as shown by detail dimensions. Provide actual sizes as required by PS 20.

1. Provide dressed lumber, S4S, unless otherwise indicted.

2. Provide seasoned lumber with 19% maximum moisture content at time of shipment for sizes 2" or less in nominal thickness.

2.02 MISCELLANEOUS LUMBER

A. General: Provide wood for support or attachment of other work including cant strips, bucks, nailers, blocking, furring, grounds, and similar members. Provide lumber of sizes indicated, and as follows:

1. Moisture Content: 19% maximum.

2. Grade: Standard Grade light framing size lumber of any species or board size lumber as required. No. 3 Common or Standard grade boards per WCLIB or WWPA rules or No. 3 per SPIB rules.

2.03 CONSTRUCTION PANELS

A. Construction Panel Standards: Comply with American Plywood Association (APA) "Performance Standard Policies for Structural-Use Panels", Form No. E445.

B. Trademark: Use factory-marked construction panels with APA trademark to show compliance with grade requirements.

C. Plywood Backing Panels: For mounting electrical or telephone equipment, provide fire retardant treated plywood panels with grade designation of APA C-D Plugged INT with exterior glue of not less than 3/4" thickness.

2.04 FASTENERS AND ANCHORAGES

A. Provide fasteners of type, size, and material and finish as required for the condition of use.

B. Where rough carpentry work is exposed to moisture, provide fasteners and anchorages with cadmium plating or a hot-dip zinc coating (ASTM A 153).

2.05 WOOD TREATMENT BY PRESSURE PROCESS

A. Preservative Treatment: Comply with applicable requirements of AWPA Standards C2 (Lumber) and C9 (Plywood) and of AWPB Standards listed below. Mark each treated item with the AWPB Quality Mark.

1. Pressure-treat above-ground items with water-borne preservatives to comply with AWPB LP-2. After treatment, kiln-dry lumber and plywood to a maximum moisture content of 15 percent. Treat the following concealed members:

a. Wood members in contact with masonry or concrete.

2. Complete fabrication of treated items prior to treatment, where possible. If cut after treatment, coat cut surfaces with heavy brush coat of chemical used for treatment to comply with AWPA M4.

PART 3 - EXECUTION

3.01 INSTALLATION, GENERAL

A. Discard units of material with defects that might impair quality of work, and units which are too small to use.

B. Set carpentry work to required levels and lines, with members plumb and true and cut and fitted.

C. Securely attach carpentry work to substrate by anchoring and fastening as required by recognized standards.

D. Countersink nail heads on exposed carpentry work and fill holes.

E. Select fasteners of size that will not penetrate from opposite side of members that will be exposed. Make tight connections between members. Install fasteners without splitting of wood; pre-drill as required.

3.02 FRAMING INSTALLATION

A. Provide framing members of sizes and install at spacings shown, comply with National Forest Products Association recommendations. Do not splice structural members between supports.

B. Necessary furring, accessories, framing and blocking shall be provided and installed at walls and ceilings, and shall be as shown on drawings or required. The Contractor shall provide blocking throughout as required whether or not explicitly indicated on Drawings.

C. Leveling of framing lumber on masonry or concrete shall be done only with slate or similar material. Wood shims of equivalent strength will be permitted on framing bearing on wood or metal.

D. No framing members shall be cut, notched or bored without permission from the Architect.

3.03 NAILERS AND BLOCKING AND GROUNDS

A. Provide where required for attachment of other work. Form to shapes as shown and cut as required for true line and level of work to be attached. Coordinate location with other work involved.

B. Attach to substrates to support applied loading. Countersink bolts and nuts flush with surfaces when necessary. Anchor to formwork before concrete placement.

3.04 CONSTRUCTION PANELS

A. General: Comply with applicable recommendations contained in Form No. E 30D, "APA Design/Construction Guide - Residential & Commercial", for types of construction panels and applications indicated.

B. Fastening Method: Fasten panels with screws or nails.

END OF SECTION

SECTION 06400

ARCHITECTURAL WOODWORK

PART 1 - GENERAL

1.01 SUMMARY

A. Work of this Section is governed by General Conditions of the Contract and by provisions contained in Division 0 and Division 1 of these Specifications.

B. Work Included: This Section generally includes the following:

1. Wood trim, moulding, frames, casings and reveals.

2. Wood veneer finished casework as indicated on Drawings and schedules; inclusive of countertops, shelving, and upper and base cabinets; reception desk with ebony high gloss finish to match Architect's control sample.

3. Solid surface countertops where indicated on the Drawings.

4. Veneered wood doors. Coordinate and comply with the applicable performance requirements of Section 08200 "Wood Doors".

5. Wood header piece with slot at solar shade - as detailed.

6. Plastic laminated finished casework as indicated on Drawings and schedules; inclusive of cabinets, bi-fold retractable doors, file enclosure, reception desk and similar items as indicated on the Drawings.

7. Closet shelves for opaque finish and polished chrome closet poles.

8. Tackable panels.

9. Coordination of architectural woodwork with file cabinets furnished under Furnishings Contract for careful integration and to ensure proper fit.

10. Coordination with related trades i.e. installation of shelving standards on walls; Artisan wall finish, fabric wrapped panels, gypsum board systems, and adequate reinforcement for installation of casework; gypsum drywall; interior stonework to ensure a complete and integrated installation.

11. Hardware for casework and shelving. Keying alike of cabinet locks of similar installation areas i.e. Pantries as determined by the Architect.

10. Grommets and wire managers.

11. Light steel framing for casework and other items of Architectural woodwork.

12. Miscellaneous steel support of millwork; miscellaneous steel support of hardware where indicated and as required. Coordinate with the applicable requirements of Section 05500 "Miscellaneous Metal" as well as Structural Drawings.

13. Rough hardware and appurtenant fastenings; masonry anchors where required.

14. Cylinders for all cabinets.

15. Drilling concrete and masonry, drilling and/or tapping metal work.

16. Shop finishing, except items indicated to be shop primed only for finish painting in field i.e. wood cap.

17. Miscellaneous specialties incorporated into woodwork.

18. Filler strips between items of architectural millwork and assemblies incorporated therein, finished to match adjacent finishes.

19. Painted wood reveal strips at file cabinets; sizes to be field verified.

C. Related Work

1. Lightweight fill, flash patching and leveling compound - Section 03320.

2. Miscellaneous metal - Section 05500.

3. Rough carpentry - Section 06100.

4. Gypsum board systems - Section 09250.

5. Painting and finishing - Section 09900.

6. Artisan Wall Finish - Section 09920.

D. Work Not In Contract (NIC)

1. Trading Desk

1.02 REFERENCE STANDARDS

A. Architectural Woodwork Institute (AWI): "Architectural Woodwork Quality Standards" and "High Pressure Laminates as an Architectural Woodwork Material", current editions.

B. NAAAM: Metal Finishes Manual.

1.03 SUBMITTALS

A. Shop Drawings: Submit preliminary and final fully-dimensioned shop drawings, based on field measurements, for approval, prior to or in conjunction with samples. Shop drawings shall comply with drawings and specifications. Coordinate with the requirements of Division 1 Specifications, including Section 01300 "Submittals". Submit (2) prints and (1) reproducible of each shop drawing with space for Architect's 6" x 8" approval stamps.

1. Review preliminary shop drawing detailing of architectural woodwork not described in drawings or specifications.

2. Dimension fully, and indicate all materials including wood species, plastic laminates, thicknesses, weight, layout, construction and jointing details, locations of shop and field joints in countertops, quantity, attachment methods and finishes, and relationship to abutting construction. Indicate grain direction.

3. Indicate room plans and elevations at appropriate scale.

4. Indicate cabinet hardware types and locations, anchors, fastenings, connections and accessories, and locations of concealed conduit and services, with provisions for access and servicing.

B. Samples: Submit 3 each of the following samples to allow time for coordination with other work. Tag samples indicating location where sample material is to be used, substrate material, wood types and grades, finish and date sample was fabricated. Two of each approved sample will be returned to the Contractor.

1. Wood Veneer Products (Transparent Finish)

a. Provide wood veneer laminated to particle board, 24" x 24", consisting of 2 face panels species and cut as specified, separated by a typical joint.

b. Perimeter of sample shall be representative of proposed edges.

2. Wood Veneer Products (Opaque Finish)

a. Provide wood veneer laminated to particle board, 24" x 24", consisting of 2 face panels species and cut as specified, separated by a typical joint.

b. Perimeter of sample shall be representative of proposed edges.

3. Wood Trim (Transparent Finish): 18" long x full profile each type and finish.

4. Exposed Cabinet Hardware: Provide 1 sample of each type and finish.

5. Plastic laminate: 12" x 12", each type and finish. Submit color for Architect's review and acceptance.

6. Melamine for plastic laminate cabinet interiors: 12" x 12", each type and finish. Submit color for Architect's review and acceptance.

7. Solid surfacing: 18" long x full profile each type and finish. Submit color for Architect's review and acceptance.

8. Fabric wrapped tackboard: Submit sample of required assembly, covered in specified woven fabric, showing corner and adjacent edges finished, two edges cut to show construction. Samples shall be indicative of all treatments to fabric. Provide full width samples, cut from the bolts to be used on the project and representing each dye lot, to illustrate the range of color and pattern variation [if any], fabric to be run vertically.

C. Certification of Fire Retardant Treatment of Wood: Submit certification, stating name of fire retardant materials used, and compliance with AWPB LB-2 for lumber and plywood. Verify Code compliance, and certify that fire retardant materials will not bleed through painted or natural finish surfaces.

D. Maintenance Instructions: Submit 3 copies, giving cleaning precautions and recommendations for each clear-finished wood, plastic laminate and for each product including cabinet hardware. Include precautions for use of cleaning materials which could damage fabric.

E. Product Data: Submit a minimum of 3 copies of manufacturer's specifications and installation instructions for manufactured materials. Submit material safety data sheets [MSDS] for all materials and products used as part of the work of this Section.

1.04 QUALITY ASSURANCE

A. Fabricator/Installer Qualifications: Firm having a minimum of 5 years of specialized experience on projects of similar size and quality to that specified and shown.

1. In each designated area, work using matched veneers and trim shall be produced by a single firm.

B. Inspect each piece of lumber and plywood or each unit of woodwork after drying; do not use twisted, warped, bowed of otherwise damaged or defective wood.

C. Compatibility of Grain and Color: The Architect reserves the right to select materials for best compatibility between visually related members and veneers.

D. On concealed surfaces mark each unit for identification and for fire retardant treatment and ratings complying with governing Codes.

E. All field joints shall be hairline fit butt joints in perfect alignment.

F. All steel and blocking located underside to plastic laminate shall be finished to match plastic laminate.

G. Plastic laminate finish shall extend a minimum of 3" at underside of all counters and edges of casework.

H. Knots and blemishes are unacceptable.

I. Location of joints in millwork shall be approved by the Architect.

J. Comply with the jurisdictional authorities' established standards and criterion for chemicals which will be used on the project when materials of less toxic nature cannot be found for use as substitutes.

1.05 COORDINATION

A. Coordinate the work of this Section with other appropriate Sections of the specifications to ensure proper scheduling for fabrication and installation.

1. Coordinate with partition and finish trades to ensure that proper provisions are made for the installation.

1.06 DELIVERY, STORAGE AND HANDLING

A. General: Protect materials and work from damage, from time of shipment to final acceptance.

B. Do not deliver until taping and spackling of wallboard, painting, wet work, and similar operations have been completed in storage and installation areas. If items specified in this section are stored off the job site, provide adequate insurance to protect the Owner from loss.

C. Verify size limitations imposed by elevators and access routes so that all shop-fabricated items can be delivered to installation areas.

D. Brace to prevent distortion in transit. Cover, ventilate, and protect work from damage by moisture, heat, staining, dirt, abrasion, or any other causes which might lead to deterioration of finish, warping, delamination, distortion, twisting, or opening of joints and seams, adversely affecting appearance or function.

E. Damaged or defective work is subject to rejection and replacement, at no cost to the Owner.

F. Contractor is assumed to have viewed accepted Project flitches and to have noted in writing any concerns as to the quality of the flitches with regard to incorporation into the work.

1.07 FIELD CONDITIONS

A. Field Measurements: Verify dimensions in the field prior to fabrication of Architectural Woodwork to assure proper fit. Before proceeding with woodwork required to be fitted to other construction, obtain measurements and verify dimensions of shop drawing details as required for accurate fit.

B. Humidity and Temperature Controls: Do not store or install architectural woodwork until after wet work is dry. Determine requirements for maintaining heating, cooling and ventilation in installation areas to reach relative humidity necessary to maintain optimum moisture content specified for woodwork.

1. Maintain and stabilize required temperature and relative humidity for a tolerance of plus or minus 1% of the specified optimum moisture content for a minimum of 3 days before woodwork receives specified finishes.

2. Refer to "Guide to Wood Species Selection", AWI, for method of determining equilibrium moisture content values.

C. Provide back plates, support plates, grounds, anchoring devices to be built into substrates, well in advance of the installation of Architectural Woodwork and installed in a timely sequence so as not to delay work of other trades. Contractor shall coordinate with other trades affected.

D. Backprime architectural woodwork at all surfaces which will be concealed with one coat of wood primer. Schedule delivery to allow time for application and drying of backpriming before installation of Architectural Woodwork.

E. Prior to installation of Architectural Woodwork, examine shop fabricated work for completion, complete work as required and remove, and properly dispose of packing or crating materials.

F. Pre-Installation Meeting: Before delivering materials or assemblies, meet at the site with representatives of Construction Manager, Architect, trades responsible for abutting construction, and those responsible for the operation of temperature and humidity control systems. Proceed with delivery and installation only when it is agreed that required ambient conditions can be maintained.

1.08 GUARANTEE

A. For 5 years from date of acceptance, guarantee all work of this section against checking, cracking, peeling, chalking, alligatoring, discoloration or other defects due to faulty materials or workmanship, or to the application of finishes to surfaces improperly prepared for coating or finishing.

B. Refinish unsatisfactory work to the Architect's satisfaction, at no additional cost to the Owner.

PART 2 - PRODUCTS

2.01 GENERAL

A. Provide woodwork as specified on drawings and on millwork and finish schedules.

B. Provide kiln-dried (KD) lumber with an average moisture content range of 6% to 11%. Maintain temperature and relative humidity during fabrication, storage and finishing operations so that moisture content values for woodwork at time of installation do not exceed 8 to 13%.

C. To the extent required by governing Codes, and as specified in Section 06100 "Rough Carpentry", use materials that have been pressure treated for fire resistance, bearing pressure treatment labels on surfaces not exposed to view. Use preservative treated materials in other locations. Treatment shall not bleed through and shall be capable to receive stains and finishes.

D. Chemicals used for wood treatment shall be formulated for indoor use, and shall not bleed through, leaving surfaces capable of receiving specified clear and opaque finishes.

E. Mill after treatment and drying to ensure precise dimensions, and handle materials in accordance with AWPA standards.

F. Comply with E.P.A. recommendations and avoid the use of construction and finishing materials that contain formaldehyde or other chemicals known to compromise indoor air quality (IAQ) during and after installation.

2.02 MATERIALS

A. Hardwood for Transparent Finish: AWI Section 100, Premium Grade, finishes to match Architect's samples.

1. W-1 Wood Veneer

a. Species: to be determined

b. Flitch: to be determined; Match Architect's control sample.

c. Cut: To be determined.

d. Matching: Sequence to match Architect's control sample.

e. Finish: To be determined

2. Solid Hardwood and Hardwood Edge Trim

a. Species: To be selected by the Architect for hardwood edges unless scheduled as painted trim or solid surface edge for plastic laminate.

b. Finish: Stain and finish as selected by the Architect.

c. Cut: Straight Cut.

B. Hardwood for Opaque Finish: Dense, premium grade closed pore hardwood which when finished, will not show any grain, imperfection or other surface defects when used with the required finish.

1. Paint grade veneered wood; shop primed for field painting per Section 09900 "Painting and Finishing" unless indicated to be shop painted.

2. Fire rated: Where required, comply with NYC Building Code requirements.

C. Grounds: Any fire-retardant-treated hardwood or kiln-dried hardwood plywood, in long lengths.

D. Plywood and Particleboard: Manufactured with low-emission adhesives.

1. Transparent Finish: AWI Section 200; AWI Premium Grade, medium density particle core unless otherwise indicated, shop finished to match Architect's sample.

2. Opaque Finish: AWI Section 200; AWI Premium Grade, polyester filled particle core unless otherwise indicated, finish to match Architect's sample. Coordinate with field finish painting under Section 09900 "Painting and Finishing."

3. Lumber core waterproof plywood with hardwood face veneers, or particleboard having the following minimum properties when tested in accordance with ASTM D1037. All countertop cores exposed to water shall be lumber core waterproof plywood; particleboard cores will not be permitted for this use.

a. Density: 45 lb./cu.ft.
b. Modulus of Rupture: 3,350 psi
c. Modulus of Elasticity: 500,000 psi
d. Internal bond strength: 110 psi
e. Screw Holding, face: 350 psi
f. Screw Holding, edge: 335 psi
g. Water absorption, 24 hours: 11%
h. Thickness swelling, 24 hours: 5%

E. Plastic Laminate - Indicated on the Drawings and Schedules as; complying with NEMA Standard LD3, matte finish, 0.05" thick as scheduled; with matching edges; unless otherwise indicated. Melamine: for interior of plastic laminate construction. Solid surfacing for edge trim where shown on the Drawings. Provide types, colors, finishes as scheduled.

F. Fabric wrapped tackboards

1. Substrate: Class A rated board, mineral fiberboard sanded and coated and set within wood frame.

2. Adhesives: Type recommended by the fabric and panel manufacturer and complying with fire resistance and environmental/air quality control requirements.

3. Backing: Apply backing of type and application recommended by fabric manufacturer for the specified fabric."

2.03 MISCELLANEOUS PRODUCTS

A. Fasteners

1. Screws, Nails and Anchors: Type, size, material and finish as required for the condition of use.

2. Velcro Tape: Size to suit loading condition.

B. Adhesives

1. Plastic Laminate: Melamine, phenol-resin or resorcinal-resin, grade and class as recommended by plastic laminate manufacturer for laminating surfaces.

2. For Other Uses: Moisture resistant type best suited for purpose.

C. Cabinet Hardware: Provide the following items of hardware or their approved equal. All hardware used shall be stainless steel unless otherwise noted and shall match Architect's approved control samples unless otherwise noted.

1. Hinges: Heavy-duty self closing type; finish as selected by the Architect (Hafele, Grass or approved equal).

   a. Provide 175 deg. opening capabilities. For end doors perpendicular to walls, provide 90 deg. type.

   b. For doors 32" high or less, provide 2 pair of hinges, add 1/2 pair for every additional 20".

2. Magnetic Catches: For swinging doors. Enclosed in plastic or aluminum case with plate steel strike (Stanley, Knape and Vogt, Epco and Hager).

   a. Double doors shall have catches on both doors, catch at top and bottom for doors over 4'-6" high.

3. Hardwood finger pulls: Type to be approved by Architect on shop drawings.

4. Touch latches: Type to be approved by Architect on shop drawings.

5. Roller latches: Type to be approved by Architect on shop drawings.

6. Pulls: Mirror pull type, (Tydix "SR") Size: 1/4" roll diameter, 2 1/2" roll length; in polished chrome finish.

7. Pulls: Tydix 4" wire pull type, in polished chrome finish to match Architect's sample.

8. Drawer slides: Positive stop, self cleaning, full extension steel ball bearing type for easy removal. Provide 75 lb. capacity minimum for box drawers and 150 lbs. for file drawers and typewriter.

9. Standards and brackets for wall-hung shelves: No. 87 heavy-duty steel standards and No. 187 brackets, No. 21 shelf rests with rubber pads at ends, satin chrome finish unless otherwise noted, by Knape & Vogt.

10. Recessed standards: shall be mortised flush provided at concealed adjustable shelves in cabinets where indicated; to be approved by the Architect on shop drawings similar to K & V 255 pilaster standards and K & V 256 shelf clips.

11. Shelf end supports: Shelf pins shall be manufactured by Garcy, white enamel finish for plastic laminate shelves. Provide 2 holes of pre-drilled holes on the sides of plastic laminate cabinets located 1-1/2" o.c. aligned on both sides, unless otherwise noted.

12. Cylinder locks: Heavy-duty type stamped with identification numbers. Coordinate with Owner for number of key changes and masterkey grouping. Key cabinet of like areas alike. Finish shall be polished chrome finish, unless otherwise noted.

    a. Mount lock face flush with surface of woodwork. Furnish (3) 3/32" thick stamped brass keys for each different lock or series from manufacturer or registered locksmith.

13. Coat hanging rods: 1-5/16" diameter satin chrome finish #3369 Garcy manufacture with concealed screw end supports, intermediate supports for spans exceeding 4'-0".

14. Grommets: Provide typical round grommets; EDP and RG Series; Doug Mockett manufacture; in color as selected by the Architect.

15. Wire Manager: Provide continuous type; WM-2; Doug Mockett manufacture; type as selected by the Architect from manufacturer's standard; continuous at undercounter locations, and elsewhere as shown on the Drawings or as required.

16. Concealed Hinge: Continuous stainless steel hinge as manufactured by Soss as approved by Architect on shop drawings.

2.04 FABRICATION - GENERAL

A. Fabrications shall be in accordance with AWI Premium grade standards for transparent finished wood veneer and AWI Custom grade standards for plastic laminate and opaque finished wood veneer. Fabricate woodwork to dimensions, profiles and details shown. Route or groove back of flat trim members, kerf backs of other wide flat members except plywood or veneered members.

B. Miter joints by joining, continuous splining and gluing to comply with requirements of the specified grade.

C. Visible edges of case and body members fabricated from plywood shall receive solid (not tape) banding. Transparent finished wood veneer panels shall be banded with wood species to match face veneers. Cut drawer fronts and cabinet doors for Tydix pulls as detailed.

D. Provide steel framing and lumber framing for architectural woodwork, complete with bracing and fastening devices as required for a rigid installation, and capable of withstanding anticipated loading. Include bracing as required to meet established deflection standards. Provide steel angles or tube supports as required to support countertop spans of 4 feet or more unless otherwise noted.

E. Perform fabrication from field measurement with allowances for scribing as required to meet work in progress field conditions.

F. Fabricate units in largest sections practical. Advise Architect of location of all field joints before fabrication. Assemble in shop for trial fit, disassemble for shipment and reassemble with concealed fasteners. Verify building conditions such as elevator sizes to ensure that the Architectural Woodwork can be delivered in sizes fabricated.

G. Reinforcing shown is minimum. Provide additional reinforcing as required to produce rigid assemblies capable of withstanding anticipated loading and ensure dimensional stability without warpage, bowing or other deformity.

H. Welding and brazing shall be of adequate strength and durability with joints tight and flush, smooth and clean.

I. Exposed surfaces shall be free from dents, tool marks, warpage, buckle, glue, open joints, or other defects affecting the function or appearance of work of this Section.

2.05 FABRICATION - SPECIFIC ITEMS

A. Standing and Running Trim: Fabricate standing and running trim sizes, profiles and dimensions indicated, according to AWI Section 300, Premium Grade, finish

as indicated. Include reveals and filler pieces where required for installation. Provide door frames complying with AWI Section 900, Premium Grade.

B. Closet, Casework and Storage Shelving

1. Provide shelving in accordance with AWI Section 600, Custom Grade, unless otherwise indicated.

2. Shelves shall be a minimum of one inch thick for spans up to 36" and 1 1/2" thick for spans over 36 inches, except where otherwise detailed. Hardwood edges of shelves shall be of 1-1/2" thickness unless otherwise noted.

3. Size components for deflection 1/4" or less when loaded with bond paper full width to a height of 14".

4. Exposed edges shall have hardwood edge bands or PVC edges where indicated.

C. Tackable panels:

1. Furnish fabric to the mill or shop for adhesive application. Work shall be shop fabricated. Field verify panel sizes. Tackboard installation system shall be "Velcro" for ease of disassembly; unless otherwise indicated in conformance with manufacturer's recommendations and Architect approved Shop Drawings.

2. Cut fabric either on the thread or by pattern, whichever is applicable. Table square fabrics and trim to appropriate sizes. Air cure fabrics to prevent sag due to variances in temperature and humidity. Stretch yarns square and plumb so fabric is not distorted or out of alignment. Install acoustically transparent fabric to back side of framework and tension to balance the frame and prevent warping or twisting. Match and level fabric patterns and grain.

3. Stretch and secure fabric wrapping to framework so that fastening technique is not evident; stretch fabric tight and square, without sagging, puckers or ripples. Wrap fabric around corners without pleats or cutting.

4. Fabric installation sequence: Use fabric rolls in consecutive numerical sequence of manufacturer. Place fabric panels consecutively in exact order they are cut from the roll. Align pattern and texture and level or plumb as appropriate to Architect's approval.

5. Apply adhesive to back of fabric covering and place in accordance with manufacturer's instructions. Allow no seepage through fabric, and keep face of covering free of adhesive.

6. Hang smooth, non-matched patterns on the wall, overlapping the edges and double cutting through both thicknesses.

7. No horizontal seams will be permitted except where color of material is different.

8. Eliminate air pockets and foreign substances underlying the wall covering. Ensure full bond to substrate surface.

9. Appearance shall be absolutely flat with finish tight and free from sags, bumps and wrinkles. Panel and woodwork construction shall not be visible or telegraph through finish.

2.06 FINISHING

A. Cabinetwork Surfaces, Definitions

1. Exposed: Visible when drawers and solid doors are closed; interiors of open cabinets; undersides of cabinets 4'-0" or more above the floor.

2. Semi-Exposed: Back faces of solid doors and drawer fronts, internal components in drawers and behind solid doors; tops of cabinets 7'-0" or more above the floor.

3. Concealed: Elements not visible after installation.

B. In accordance with AWI Section 1500, prepare for and apply clear factory finishes.

1. Sand, fill and countersink fasteners.

2. Prime for opaque finishes.

3. Match of contiguous wood elements in any one space, apply finishes concurrently.

4. Before application of field finishes to moldings and fillers applied around construction by other trades, fill or spackle interstices with compatible materials.

C. Finishes shall be free from runs, sags and other visual defects.

D. Shop and Field Finishes: Shall match Architect's Control samples.

E. Hand smooth and hand sand wood to remove traces of machine and tool marks.

F. Deburr, clean and degrease steel or other metal components prior to finishing. Requirements for surface preparation shall be in accordance with AWI Standards specified.

G. Tone or stain solid lumber to match adjacent veneers unless otherwise noted.

PART 3 - EXECUTION

3.01 INSPECTION

A. Examine the areas and conditions where architectural woodwork is to be installed and notify the Contractor and the Architect of conditions detrimental to the completion of the work.

B. Do not proceed with the work until unsatisfactory conditions have been corrected.

3.02 PREPARATION

A. Provide backplates and anchoring devices to be built into substrates, installed in a timely sequence to avoid delaying work of other trades and prior to installation of architectural woodwork.

B. Backprime concealed surfaces and allow time for drying before installation.

C. For 3 days prior to installation condition architectural woodwork to average temperature and humidity conditions prevailing in installation areas.

3.03 INSTALLATION

A. Install the work plumb, level, true and straight with no distortions. Shim as required using concealed shims. Install to a tolerance of 1/8" in 8'-0" for plumb and level (including countertops), and with 1/16" maximum offset in flush adjoining surfaces, 1/8" maximum offset in revealed adjoining surfaces.

B. Scribe and cut work to fit adjoining work, and refinish cut surfaces or repair damaged finish at cuts.

C. Anchor woodwork to anchors or blocking built-in or directly attached to substrates. Secure to grounds, stripping and blocking with countersunk, concealed fasteners and blind nailing as required for a complete installation.

D. Provide holes and cutouts of verified size and location required for built-in equipment and mechanical, electrical and communication services. Verify size of openings with actual sizes of equipment prior to making openings. Form inside corners to a radius of not less than 1/8 inch. After sawing, rout and file cut-outs. Seal exposed edges at sinks and areas where there is moisture with water resistant sealant acceptable to the Architect.

E. Adjust millwork and hardware so that all operable items such as doors and drawers operate smoothly and without warp, bind or creep. Lubricate hardware as recommended by hardware manufacturer.

F. Level all items in their final locations and align as indicated on the Drawings. Method of leveling all floor supported units must be of a concealed, adjustable type acceptable to the Architect. Exposed shims will not be allowed. Shims may be used only where acceptable to the Architect, and then only if the shims used will be totally concealed and attached with adhesive or two-sided tape so that shims cannot become dislodged.

3.04 FRAMING AND MISCELLANEOUS WOOD SUPPORTS

A. Use specified framing lumber, sizes and spacing as indicated on drawings and as required to support loads.

B. Framing shall be cut square on bearings, closely fitted, accurately set to required lines and levels, rigidly secured in place at bearings and connection with nails, lag screws and/or bolts as required by conditions.

C. Install wood grounds, blocking, nailers, furring, and the like for work of this Section, where shown and where required, dressed to size indicated or required to suit the condition. Install rigidly, in proper alignment.

3.05 ROUGH HARDWARE

A. Secure wood to concrete with countersunk bolts in expansion sleeves, to steel with countersunk bolts, to hollow masonry and to gypsum board with heavy duty countersunk toggle bolts; or other approved manner. Space fastenings not more than 16" apart.

B. Connections and fastenings shall be made in such manner as will compensate for swelling and shrinkage an as will permit the work to remain permanently in place without any splitting or opening of joints.

3.06 CASEWORK HARDWARE

A. Locations and positioning of hardware shall be subject to the Architect's approval. Install doors plumb and true, and fit hardware to ensure smooth operation without forcing.

3.07 CASEWORK

A. Where practical, use concealed anchors and fasteners. Where not practical, anchor and fasten casework in inconspicuous places subject to Architect's approval.

B. Work which adjoins gypsum board, concrete, or other finishes, shall be fitted and scribed in a careful manner with sufficient allowance given for cutting and scribing.

C. Erect work true to lines, levels and dimensions, square, aligned and plumb, securely and rigidly fastened in place.

3.08 CLOSET SHELVING

A. Provide closet shelving at the locations shown, painted wood with hardwood edges, shop finished, unless otherwise indicated. Install hanging rods with supports indicated.

3.09 TRIM

A. Install as detailed, flush with adjoining surfaces unless otherwise shown, with minimum number of joints possible, using full length pieces for each run. Align reveals, cope at returns, miter corners.

B. Joints of trim and/or mouldings shall be set tight, miter exterior angles and cope interior angles. Joints, except end joints less than 12' apart, will not be permitted in straight runs.

C. Secure trim with glue and blind nail with finishing nails. Set exposed nail heads in finished work and putty. Sand all work to remove any tool marks and irregularities.

D. Wood shall receive finishes as specified herein and as indicated on the Drawings.

3.10 FINISHING

A. Shop apply finishes, unless otherwise noted.

B. Field Touch-Up: Field touch-up includes filling and touch-up of exposed job made nail or screw holes, refinishing of raw surfaces resulting from job fitting, repair of job inflicted scratches and mars, and final cleaning up of the finished surfaces.

3.11 CLEAN UP AND PROTECTION

A. Adjust hardware and operable components for smooth operation, and lubricate hardware if recommended by manufacturer.

B. Clean Up: Clean up and remove debris and excess material from the site at regular intervals during the course of the work. Upon completion of installation, clean all spaces of debris caused by woodwork installation.

C. Protection

1. Millworker shall provide adequate protection of woodwork to prevent marring, defacement of other damage until final completion and acceptance of the project by the Owner. Repair or replace defective units prior to final inspection as directed by the Architect.

2. Units that cannot be satisfactorily repaired in the opinion of the Architect shall be replaced with new units of same original design, at no additional cost to the Owner.

D. Remove protection when directed and dust surfaces to leave installation ready for Owner's use.

END OF SECTION

SECTION 07200

BUILDING INSULATION

PART 1 - GENERAL

1.01 SUMMARY

A. Work of this Section is governed by General Conditions of the Contract and by provisions contained in Division 0 and Division 1 of these Specifications.

B. Work Included: This Section generally includes the following:

1. Sound barrier pillows where shown on the Drawings including juncture of room partition and exterior wall at convector enclosure.

2. Firestopping.

C. Related Work:

1. Rough and finish carpentry - Section 06100.

2. Architectural woodwork - Section 06400.

3. Joint sealants - Section 07900.

4. Gypsum board systems (sound insulation blanket) - Section 09250.

1.02 SYSTEM PERFORMANCE

A. Provide insulation which has been produced and installed to establish and maintain acoustical performance.

1.03 QUALITY ASSURANCE

A. Obtain each insulation product type from a single source.

1.04 SUBMITTALS

A. Product Data: Submit manufacturer's technical data for each type of insulation required, including instructions for installation.

B. Samples: Submit samples when requested by Architect.

C. Certificates: Submit certificates from manufacturer attesting that their products comply with specification requirements and are suitable for the use indicated.

D. Submit manufacturer's standard warranty for a period of one year from date of substantial completion.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in original unopened packaging with labels indicating manufacturer, product name and designation.

B. Store and handle insulation materials to prevent their deterioration or damage due to moisture, temperature changes, contaminants, or other causes.

PART 2 - PRODUCTS

2.01 INSULATION

A. Sound Barrier Pillows: Lightweight, flexible insulation formed of mineral fiber; similar to "Acoustic Pillows", sound barrier pillows as manufactured by Controlled Acoustics Corporation or equivalent.

2.02 FIRESTOPPING

A. Provide firestopping systems that are produced and installed to resist the spread of fire, according to requirements indicated, and the passage of smoke and other gases.

B. F-Rated Through-Penetration Firestop Systems: Provide through-penetration firestop systems with required F ratings, as determined per ASTM E 814, but not less than that equaling or exceeding the fire-resistance rating of the constructions penetrated.

C. T-Rated Through-Penetration Firestop Systems: Provide through-penetration firestop systems with T ratings, in addition to F ratings, as determined per ASTM E 814, where systems protect penetrating items exposed to contact with adjacent materials in occupiable floor areas. T-rated assemblies are required where the following conditions exist:

1. Where firestop systems protect penetrations located outside of wall cavities.

2. Where firestop systems protect penetrations located outside fire-resistive shaft enclosures.

3. Where firestop systems protect penetrations located in construction containing doors required to have a temperature-rise rating.

4. Where firestop systems protect penetrating items larger than a 4-inch-diameter nominal pipe or 16 sq. in. in overall cross-sectional area.

5. Fire-Resistive Joint Sealants: Refer to Section 07900 "Joint Sealants".

6. For firestopping exposed to view, traffic, moisture, and physical damage, provide products that do not deteriorate when exposed to these conditions.

D. Provide accessory components for each firestopping system that are needed to install fill materials and to comply with performance requirements. Use only components specified by the firestopping manufacturer and approved by the qualified testing and inspecting agency for the appropriate designated fire-resistance-rated systems. Accessories include but are not limited to the following items:

1. Permanent forming/damming/backing materials including the following: Semirefractory fiber (mineral wool) insulation; ceramic fiber; sealants [Refer *to Section 07900; fire-rated formboard; temporary forming materials;* primers; collars; steel sleeves.

PART 3 - EXECUTION

3.01 PREPARATION

A. Examine the areas and conditions where building insulation is to be installed and notify the Architect or conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected by the Contractor in a manner acceptable to the Architect.

3.02 INSTALLATION

A. General: Comply with manufacturer's printed installation instructions, except where more stringent requirements apply.

B. Extend insulation full thickness as shown or as required. Cut and fit tightly around obstructions, and fill voids. Remove projections which interfere with placement. Install with edges closely butted.

END OF SECTION

SECTION 07900

JOINT SEALANTS

PART 1 - GENERAL

1.01 SUMMARY

A. Work of this Section is governed by General Conditions of the Contract and by provisions contained in Division 0 and Division 1 of these Specifications.

B. Work Included: This Section generally includes the following:

1. Interior elastomeric, non-elastomeric and fire resistant joint sealers generally consisting of the following.

   a. Joints formed by the intersection of different materials and surfaces, vertically - silicone sealant.

   b. Joints between stone paving and intersecting vertical surfaces - urethane sealant.

   c. Vertical joints between abutting stone or masonry - silicone sealant.

   d. Interior joints to be painted- acrylic sealant.

   e. Joints in ceramic tile work - silicone sealant with fungicide.

   f. Foam fire safing.

2. Joint sealer accessories.

3. Acoustical seal where partitions intersect building facade, inclusive of mullions and perimeter induction units.

C. Related Work

1. Building Insulation - Section 07200.

2. Glass and Glazing [Butt Glazing Sealant] - Section 08800.

3. Gypsum Board Systems [Acoustical sealers] - Section 09250.

4. Tile Work - Section 09300.

5. Interior Stonework - Section 09630.

1.02 SYSTEM PERFORMANCE

A. Provide joint sealers that have been produced and installed to establish and maintain watertight and airtight continuous seals.

1.03 QUALITY ASSURANCE

A. Installer Qualifications: Installer shall have successfully completed within the last 5 years at least 5 joint sealer applications similar in type and size to this project and shall be able to provide evidence of work upon request.

B. Single Source for Joint Sealer Materials: Obtain joint sealer materials from a single manufacturer for each type of product.

C. Pre-construction Field Tests: Prior to installation of joint sealants, field-test adhesion to joint substrates as recommended in ASTM C 962.

D. Tile Council of America: Details for Control, Contraction and Isolation Joints.

1.04 SUBMITTALS

A. Product Data: Submit manufacturer's technical data for each joint sealer product required, including instructions for joint preparation and joint sealer application.

B. Samples: Submit a minimum of 3 manufacturer's standard bead samples consisting of strips of actual products showing full range of colors available.

C. Certificates: Submit certificates from manufacturers of joint sealers attesting that their products comply with specification requirements and are suitable for the use indicated.

D. Submit manufacturer's standard warranty for a period of five years from date of substantial completion.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in original unopened containers with labels indicating manufacturer, product name and designation, color, expiration date, pot life, curing time and mixing instructions.

B. Store and handle materials to prevent their deterioration or damage due to moisture, temperature changes, contaminants, or other causes.

1.06 PROJECT CONDITIONS

A. Environmental Conditions: Do not proceed with installation of joint sealers under the following conditions:

1. When ambient and substrate temperature conditions are outside the limits permitted by joint sealer manufacturers.

2. When joint substrates are wet or dirty.

B. Joint Widths: Do not proceed with installation of joint sealers when joint widths are not within ranges allowed by joint sealer manufacturers.

PART 2 - PRODUCTS

2.01 MATERIALS, GENERAL

A. Compatibility: Provide joint sealers, joint fillers and related materials that are compatible with one another and with joint substrates, as demonstrated by testing and field experience.

B. Colors: Provide colors of joint sealers as selected by the Architect.

2.02 ELASTOMERIC JOINT SEALERS

A. Elastomeric Sealant Standard: Provide manufacturer's standard chemically curing, elastomeric sealant of base polymer indicated which complies with ASTM C 920 for Type, Grade, Class, and Use.

1. Definitions: ASTM C920 designations are defined as follows:

a. Type S: Single component sealant, no mixing is required.

b. Grade NS: Products that can be applied to vertical surfaces without sagging between 40 degrees F. and 122 degrees F.

c. Class 25: Sealants which can withstand an increase or decrease of plus or minus 25% of joint with without loss of adhesion.

d. Uses: NT (non-traffic), M (metal), G (glass), A (aluminum) and O (other substrates).

B. One-Part Non-Acid-Curing Silicone Sealant: Type S; Grade NS; Class 25; Medium modulus; Use NT, M, G, A and, as applicable to substrates indicated, 0.

1. Additional capability, when tested per ASTM C 719, to withstand 50 percent increase and decrease of joint width and comply with other requirements of ASTM C 920.

2. Products: Provide one of the following:

a. "Dow Corning 790"; Dow Corning Corp.

b. "Silpruf"; General Electric Co.

c. "864", Pecora Corp.

d. "Spectrum 2"; Tremco, Inc.

C. Horizontal traffic bearing application

1. Definitions: ASTM C920 designations are defined as follows:

a. Type M: Multiple component sealant, mixing is required.

b. Grade P: Products that can be applied to horizontal surfaces subject to pedestrian traffic.

c. Class 25: Sealants which can withstand an increase or decrease of plus or minus 25% of joint with without loss of adhesion.

d. Uses: T (traffic), O (other substrates).

2. Two-Part Urethane Sealant Type M; Grade P; Class 25; Use T, O and with Shore A hardness of 40 or greater.

3. Products: Provide one of the following:

a. As manufactured by Sonneborn type as recommended by the manufacturer and accepted by Architect.

b. Or approved equal by Tremco Mfg. Co., Inc.

E. One-Part Mildew-Resistant Silicone Sealant: Type S; Grade NS; Class 25; Use NT, G, A and, as applicable to non-porous joint substrates indicated, 0.

1. Provide sealant formulated with fungicide for sealing interior joints with non-porous substrates at plumbing fixtures.

2. Products: Subject to compliance with requirements, provide one of the following:

a. "Dow Corning 786"; Dow Corning Corp.

b. "SCS 1702"; General Electric Co.

c. "863 #345 White"; Pecora Corp.

d. "Proglaze White"; Tremco Corp.

2.03 NON-ELASTOMERIC JOINT SEALERS

A. Non-Elastomeric Sealant:

1. Provide interior non-elastomeric joint sealers between dissimilar materials with minimum increase and decrease of joint width.

2. Products: Subject to compliance with requirements, provide one of the following:

   a. Acrylic Latex; Pecora Corp.

   b. Acrylic Latex; Tremco Corp.

   c. Acrylic Latex; Sonneborn Corp.

2.04 FIRE-RESISTANT JOINT SEALERS

A. General: Provide standard sealant and accessory materials with fire-resistance rating identical to assemblies whose fire endurance has been tested per ASTM E 84 by Underwriters Laboratories, Inc. or other testing agency acceptable to authorities.

B. Safing Sealant: One or two-part, foamed-in-place, silicone sealant formulated for use as part of a through-penetration fire-stop system for filling openings around cables, conduit, pipes and similar penetrations through walls and floors.

1. Products: Subject to compliance with requirements, provide one of the following:

   a. "Dow Corning Fire Stop Foam"; Dow Corning Corp.

   b. "Pensil 851"; General Electric Co.

   c. "Dow Corning Fire Stop Sealant"; Dow Corning Corp.

   d. "3M Fire Barrier Caulk CP-25"; Electrical Products Div./3M

2.05 JOINT SEALANT BACKING

A. General: Provide sealant backings which are non-staining; are compatible with joint substrates, sealants, primers and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.

B. Plastic Foam Joint-Fillers: Pre-formed, compressible, resilient, non-waxing, non-extruding strips of plastic foam of material indicated below, and of size, shape and density to control sealant depth.

1. Either flexible, open cell polyurethane foam or non-gassing, closed-cell polyethylene foam, unless otherwise indicated.

C. Tubing Joint-Fillers: Neoprene, EPDM or silicone tubing complying with ASTM D 1056, non-absorbent to water and gas, resilient at temperatures down to -26 deg. F. Provide products with low compression set and of size and shape to provide a secondary seal.

D. Bond-Breaker Tape: Polyethylene tape or other plastic tape to prevent bond between sealant and materials at back of joint. Provide self-adhesive tape where applicable.

E. Gasketing: Neoprene, size and type as required to suit condition; as manufactured by Mahoney or equivalent.

2.06 MISCELLANEOUS MATERIALS

A. Primer: Provide type recommended by joint sealer manufacturer where required for adhesion of sealant to joint substrates, as determined from pre-construction joint sealer-substrate and field tests.

B. Cleaners for Non-Porous Surfaces: Provide non-staining, chemical cleaner of type acceptable to manufacturer of sealant and sealant backing materials which are not harmful to substrate and adjacent non-porous materials.

C. Masking Tape: Provide non-staining, non-absorbent type compatible with joint sealant and to surfaces adjacent to joints.

D. Accessory Materials for Fire-Safing Sealants: Provide forming, joint-fillers, packing and other accessory materials required for installation of fire-safing sealants.

PART 3 - EXECUTION

3.01 INSPECTION

A. Inspect joints to receive joint sealers for compliance with requirements. Report conditions detrimental to joint sealer work. Proceed after unsatisfactory conditions have been corrected.

3.02 PREPARATION

A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealers to comply with recommendations of joint sealer manufacturers and the following requirements:

1. Remove all foreign material from joint substrates which could interfere with adhesion of joint sealer, including water.

2. Clean porous joint substrate surfaces to produce a clean, sound substrate. Remove loose particles remaining from cleaning.

3. Remove laitance and form release agents from concrete.

4. Clean non-porous surfaces by chemical cleaners or other means which are not harmful to substrates or leave residues that may affect joint sealers.

B. Joint Priming: Prime joint substrates to comply with joint sealer manufacturer's recommendations. Confine primers to areas of joint sealer bond; not on adjoining surfaces.

C. Protection: Mask adjoining surfaces which might be permanently stained or damaged by sealant or by cleaning required to remove sealant. Remove tape immediately after tooling without disturbing joint seal.

3.03 INSTALLATION OF JOINT SEALERS

A. General: Comply with joint sealer manufacturer's printed installation instructions, except where more stringent requirements apply.

B. Elastomeric Sealant Installation Standard: Comply with ASTM C 962 for use of joint sealants as applicable to conditions indicated.

C. Installation of Sealant Backings: Install sealant backings to comply with the following requirements:

1. Install joint-fillers to produce the cross-sectional shapes and depths of sealants for optimum capability.

   a. Do not leave gaps between ends of joint-fillers.

   b. Do not stretch, twist, puncture or tear joint-fillers.

   c. Do not use absorbent joint-fillers which are wet.

2. Install bond breaker tape where required to prevent third-side adhesion of sealant to back of joint.

3. Install compressible seals serving as sealant backings to comply with requirements indicated above for joint fillers.

D. Installation of Sealants: Install sealants by proven techniques that result in sealants directly contacting joint substrates, completely filling joint recesses and providing uniform, cross-sectional shapes and depths which allow optimum sealant movement.

E. Installation of Sealant in Expansion/Control Joints Exposed to Pedestrian Traffic: Provide interior 2 part elastomeric joint sealer with minimum Shore A hardness of 35. complying with the applicable requirements set forth in this Specification and with Tile Council of America guidelines; and final shop drawings. Clean edges of stone. Prime as required. Keep primer from the stone face. Size as recommended but not less than ¼". Coordinate with Section 09630 "Interior Stonework".

F. Tooling of Non-Sag Sealants: Tool sealants to form smooth, uniform beads to eliminate air pockets and to ensure adhesion of sealant with sides of joint. Remove excess sealants from adjacent surfaces.

1. Provide concave joints, unless otherwise indicated.

G. Installation of Fire-Safing Sealant: Install sealant and accessory materials to fill openings around mechanical and electrical services penetrating floors and walls to provide fire-stops with required fire resistance ratings.

3.04 CLEANING

A. Clean off excess sealant or sealant smears adjacent to joints as work progresses by methods and with cleaning materials approved by manufacturers of joint sealers and of products in which joints occur.

3.05 PROTECTION

A. Protect joint sealers from contaminating substances and damage, so that they are sound and without deterioration at time of substantial completion.

B. Remove damaged or defective joint sealers and re-seal joints.

END OF SECTION

SECTION 08110

HOLLOW METAL DOORS AND FRAMES

PART 1 - GENERAL

1.01 SUMMARY

A. Work of this Section is governed by General Conditions of the Contract and by provisions contained in Division 0 and Division 1 of these Specifications.

B. Work Included: This Section generally includes the following:

1. Flush hollow metal doors and frames for hollow metal doors, where indicated on the Drawings.

2. Make provisions and coordinate for Electrical work required for the work of this project including frame cutouts for security hardware and related items.

3. Coordination with related work of related trades.

C. Related Work

1. Cutting and patching - Section 01045.

2. Selective demolition and alterations work - Section 02050.

3. Rough carpentry - Section 06100.

4. Architectural woodwork - Section 06400.

5. Wood doors - Section 08200.

6. Finish hardware - Section 08700.

7. Painting and finishing - Section 09900.

8. Electrical - Division 16 Specifications Series.

C. Work Not In Contract (NIC)

1. Resilient flooring and base covering - Section 09650.

2. Carpeting - Section 09680.

1.02 REFERENCE STANDARDS

A. "Recommended Specifications for Standard Steel Doors and Frames" (SDI-100) published by the Steel Door Institute.

B. "Recommended Erection Instructions For Steel Frames" (SDI-105) published by the Steel Door Institute.

C. "Structural Welding Code" by the American Welding Society (AWS).

D. "Recommended Locations for Finish Hardware" published by the Door Hardware Institute DHI).

E. Fire-Rated Door and Frame Assemblies: Comply with NFPA 80. Provide assemblies which have been tested, listed and fitted with riveted labels to show hourly rating as scheduled on Drawings, in accordance with requirements of MEA, BS&A and other authorities having jurisdiction.

1.03 QUALITY ASSURANCE

A. All frames shall be of welded steel construction. Knock down frames are unacceptable.

1.04 SUBMITTALS

A. Product Data: Submit a minimum of 3 copies of manufacturer's technical product data to verify that products comply with Specifications.

B. Certificates: Submit manufacturer's certifications for each hollow metal unit which is shown for a labeled opening but is larger than the size limitations established by the labeling authority having jurisdiction. State that the unit has been constructed in accordance with the applicable requirements for labeled construction. Provide certification that the prime finish on the hollow metal doors and frames has been tested and accepted in accordance with ANSI A224.

C. Shop Drawings

1. Show dimensions and details of door and frame types, conditions at opening, details of construction, location of reinforcement, with details and locations of joints and connections. Show anchorage, accessory items and installation requirements for finish hardware.

2. Clearly identify work that cannot be factory assembled, to assure proper assembly at project.

3. Submit a schedule of door frames using same reference numbers for details and openings as drawings.

4. Indicate routing of electrical metal raceway or electrical conduit for electric hardware devices (if any).

1.05 DELIVERY, STORAGE AND HANDLING

A. Protect from damage during delivery, and inspect doors and frames upon delivery. Minor damage may be repaired if repaired items are accepted by the Architect. Replace damaged items not acceptable to the Architect.

B. Store on site in a protected area until ready for installation.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Provide hollow metal doors and frames as manufactured by Acme Door, or equivalent.

2.02 HOLLOW METAL DOOR AND FRAME MATERIALS

A. Hot-Rolled Steel Sheets: Commercial quality carbon hollow metal, pickled and oiled, complying with ASTM A 568 and ASTM A 569.

B. Cold-Rolled Hollow Steel Sheets: Commercial quality carbon steel, complying with ASTM A 366 and ASTM A 568.

C. Supports and Anchors: 18 gauge (minimum) galvanized sheet steel.

D. Inserts, Bolts and Fasteners: Manufacturer's standard units use countersunk flat Phillips head screws and bolts where exposed.

E. Shop Applied Primer: Rust-inhibitive, suitable for air-drying or baking, as a base to receive specified field finishes. Comply with ANSI A224.1, PAR. 4

2.03 FABRICATION

A. Doors: SDI-100, Grade III (extra heavy duty), Model 3 (seamless), minimum 16-gauge faces.

1. Fabricate faces of doors and panels from cold-rolled steel. Join door faces at their vertical edges by a continuous weld extending full height.

2. Grind, fill and dress welds to make joints smooth, flush and invisible.

3. Bevel lock and hinge edges 1/8" in 2".

B. Frames: 16-gauge (minimum) cold-rolled steel for doors 7 feet and under; 14 gauge (minimum) cold-rolled steel for doors above 7 feet; with mitered and welded corners, finished flush. Gussets are not acceptable.

1. Anchors: Provide tee shaped corrugated or perforated metal anchors into adjoining masonry or concrete construction. Use adjustable anchors with friction fit for frames set in masonry. Weld to frames set in concrete. Fabricate anchors of steel no lighter than the gauge used for the frame, 2-1/2" wide by 10" long, 3 per jamb up to 7 ft. high and 4 per jamb over 7 ft. high; 16 gauge (minimum), and 1 floor anchor, 14 gauge (minimum), per jamb. Frames over 8'-0": Add 1 wall anchor per jamb for each additional 2' or less in height. Provide for not less than 2 inch height adjustment of floor anchors.

2. Anchor frame jambs to concrete or masonry with 3/8 in. concealed bolts into expansion type shields or inserts, minimum of 4 per jamb. Apply removable stops to cover anchor bolts.

3. Where frames are set into drywall, weld 16 gauge anchor clips 2 feet o.c. to each jamb and head. Anchor clips shall match the size and type of stud used in each wall.

4. Provide 16 ga. steel channel temporary spreaders at the bottom of all 3 sided frames to prevent distortion during shipment and storage and to hold frames in proper position until anchorage and adjacent construction has been completed.

5. Terminate bottom of frames at the indicated finished floor level. Where floor fill or setting beds occur support frame by adjustable clip angles anchored to the structural substrate. Angle floor clips shall be 12 gauge, welded to frame and punched for (2) 3/8" fasteners.

6. Reinforce head of frames over 3 ft. wide with 12 gauge steel channel unless a structural lintel is provided to support the wall construction above the frame or unless there is no wall construction above the frame.

7. Mortise, reinforce, drill and tap frames for mortise type hardware. For surface mounted hardware, provide internal reinforcement which is to be field drilled and tapped. Locate hardware in frames to match location shown or specified for doors and in accordance with approved hardware schedule and templates. Prepare frames for hardware with ANSI A115, and SDI 107, except with the following modifications: Hinge reinforcements: 7 gauge steel;

strike reinforcements: 12 gauge x size required by accepted hardware manufacturer; Closer and holder reinforcement: 12 gauge, size as required by accepted hardware manufacturer.

8. Fully enclose electrical junction boxes or mortar shields over all mortises. Provide removable access plates in the heads of frames to receive concealed door closers, if any. Offset reinforcement so that faces of hinges or keepers are flush with face of the frame rebate.

9. Where frames are to be fully grouted, coat the back of the frame with bituminous paint.

10. Drill stops to receive 3 silencers on strike jambs for single doors and 2 silencers on heads of frames for pairs of doors.

2.04 FINISH HARDWARE PREPARATION

A. Coordinate with and make preparations for receipt and installation of security hardware.

B. Drill frames for silencers, reinforce and otherwise prepare hollow metal doors and frames for finish hardware in accordance with approved Finish Hardware Schedule. Use templates furnished under Section 08700 and metal of gauges recommended by finish hardware manufacturers.

C. Locate finish hardware in accordance with "Recommended Locations for Builder's Hardware", published by Door and Hardware Institute, unless otherwise indicated on approved shop drawings.

2.05 EDGE CLEARANCES

A. Heads, Meeting Stiles and Jambs: 1/8".

B. *Door Sills (without threshold): 1/4" maximum above finished floor, unless* otherwise indicated.

C. Door Sills (with threshold): 1/2" maximum above finished floor, unless otherwise indicated.

2.06 SHOP PRIMING

A. Clean hollow metal surfaces of mill scale, rust, oil, grease, dirt and other foreign materials before application of primer by use of wire brushes or other effective means. Comply with SSPC-SP-1 "Solvent Cleaning". Fill as required to fill seams in edges.

B. Clean and treat exposed surfaces of hollow metal doors and frames inside and out, whether exposed or concealed in construction and apply 2 coats of shop coat of primer of even consistency, to provide a uniform surface thickness of 1.5 mils.

C. Apply 2 coats of metal primer to all reinforcement and attachment steel and framing which will be in contact with masonry or concrete.

D. Make doors ready to receive field-applied paint specified in Section 09900 "Painting and Finishing".

2.07 GLAZING

A. Glazing shall be tempered in thickness as indicated and/or as required. Coordinate with the applicable glazing requirements of Section 08800 "Glass and Glazing".

2.08 WIRING

A. Prepare frames to receive wiring through building sources through intermediate raceway splines to power switches in the door jambs or to telephone or power outlets in the base.

B. The use of flexible cable for wiring shall comply with requirements of the National Electric Code and shall be best practice. All electrical devices and fittings shall be provided under Division 16 Specification Series.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Install hollow metal doors and frames in accordance with manufacturer's recommendations, the provisions of SDI-105, reference standards, and the requirements of authorities having jurisdiction. Coordinate with Section 09250 "Gypsum Board Systems".

1. Install fire rated doors and frames in accordance with NFPA No. 80.

B. Where possible, place frames prior to construction of enclosing walls and ceilings. Set frames accurately in position, plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces and spreaders leaving surfaces smooth and undamaged.

C. Install with at least 3 wall anchors per jamb, at hinge and strike levels, and anchor to floor. Allow for secure and rigid fastening of assemblies to substrate.

D. Install continuous rubber seals in frames of hollow metal entrance assembly after final finish coat has been applied.

E. Fit hollow metal doors accurately in frames, with clearances as specified.

F. Install fire-rated doors with clearances specified in NFPA Standard No.80, and in accordance with authorities having jurisdiction.

G. Coordinate installation with contiguous work by other trades.

H. Ensure assemblies are plumb, level and free of warp or twist. Maintain dimensional tolerances and alignment in adjacent work.

3.02 PRIME COAT TOUCH-UP

A. After installation, sand smooth any rusted or damaged areas of prime coat and apply touch-up of compatible air-drying primer.

3.03 FINAL ADJUSTMENTS

A. Make final adjustments to framing to ensure tight joints and continuous lines.

B. Check and adjust operating finish hardware items, leaving doors, frames and hardware in proper operating condition.

END OF SECTION

SECTION 08200

WOOD DOORS

PART 1 - GENERAL

1.01 SUMMARY

A. Work of this Section is governed by General Conditions of the Contract and by provisions contained in Division 0 and Division 1 of these Specifications.

B. Work Included: This Section generally includes wood doors in accordance with the size, shape, and details shown on the Drawings; including the following:

1. Solid core flush wood doors for opaque field painted finish; rated and/or non-rated; where indicated on Drawings and Schedules. Coordinate with work of related trades".

2. Veneer finished doors for transparent finish are provided under Section 06400 "Architectural Woodwork"; coordinate accordingly.

3. Reinforcement of bottom rail of doors where undercutting is indicated or required for adjustment to existing floor level.

C. Related Work

1. Architectural woodwork - Section 06400.

2. Hollow metal doors and frames - Section 08110.

3. Finish hardware - Section 08700.

4. Painting and finishing - Section 09900.

1.02 REFERENCE STANDARDS

A. AWI Quality Standard: Section 1300 - Type II or better - Premium Grade Flush Doors and Section 1500 - Factory Finishing, in "Architectural Woodwork Quality Standards", published by the Architectural Woodwork Institute (AWI).

B. NWWDA Installation Standards Published by the National Wood Window and Door Association.

1.03 REQUIREMENTS OF REGULATORY AGENCIES

A. Where indicated, provide fire-rated flush wood doors to comply with the label requirements of the Board of Standards and Appeals/New York City Building Code.

1.04 SUBMITTALS

A. Product Data: Submit door manufacturer's product data, specifications and installation instructions for each type of wood door.

1. Include details of core, edge and glazed panel construction.

2. Include certifications to show compliance with specifications.

B. Shop Drawings: Submit shop drawings for each type of wood door showing materials, jointing methods, elevations, details of construction, locations and sizes of cutouts for glass or louvers, reveals, locations of hardware and extent of hardware blocking, and requirements for finishing, with schedule indicating location and size of each door.

1. Indicate method of reinforcement of bottom rail and related door elements for undercutting of doors to accommodate existing floor levels and floor finishes.

C. Certificates: Submit manufacturer's certification that all wood doors are manufactured to requirements of NWMA I.S.1 Industry Standard for Wood Flush Doors and that they bear the NWMA Wood Flush Door Certification Hallmark.

D. Warranty: Submit manufacturer's standard door warranty for the life of the original installation, subject to the provisions of the "Standard Door Guarantee: of the National Woodwork Manufacturer's Association as to tolerance only. Warranty shall provide for removal of defective door and replacement and finishing of new door, including installation as originally specified. A representative of the door manufacturer shall inspect the installed doors and shall note on the warranty that no provisions of the guarantee have been nullified in the manufacture and/or installation.

E. Finish Samples: Submit 12" x 12" sample series of finishes, for each type of factory finish to show Contractor's variation. Samples accepted by the Architect will become the "Architect's sample" and shall establish the visual appearance acceptable for the project.

F. Samples:

1. Submit a 12" x 12" corner sample, fully finished, of each type of wood door unless otherwise indicated. Show recessed base [if any], construction and finish.

2. Submit full height door for review.

3. After approval of samples, submit a full-size finished mock-up of each door type which, when approved, may be installed and will serve as a quality standard for the project.

1.05 QUALITY ASSURANCE

A. Single Source Supplier: To ensure uniformity in quality, appearance and construction, obtain all doors from a single manufacturer acceptable to the Architect.

B. Contractor shall inform manufacturer of all finishes and procedures specified prior to manufacture.

1.06 DELIVERY, STORAGE AND HANDLING

A. Package doors in factory, with labels identifying installation locations.

B. Protect in transit, and store in a secure dry location, stacked as recommended by manufacturer.

C. Do not deliver to or unpack doors in areas where painting and other wet work is incomplete. Comply with the NWWDA reference standards.

1.07 WARRANTY

A. Submit written agreement on door manufacturer's standard form signed by manufacturer, installer and contractor, agreeing to repair or replace defective doors which have warped (bow, cup or twist) or which show telegraphing of core construction through face veneers, or do not conform to tolerance limitations of AWI.

B. The warranty shall also include, without cost to the Owner, provisions for refinishing and reinstallation of doors removed for repair or replacement because of defects.

C. The warranty shall note that the doors, after installation, have been inspected by a representative of the manufacturer, and that no provisions of the warranty have been nullified by installation.

D. Warranty shall be in effect for the life of the installation.

PART 2 - PRODUCTS

2.01 FABRICATION - GENERAL

A. Fabricate wood doors in strict accordance with the referenced standards for the grades specified, with full flush faces and with horizontal and vertical reveals as detailed and of types, sizes and finishes shown on door schedules, as follows:

1. Opaque finishes: AWI Premium Grade, 5 ply.

B. Maximum Allowable Warp or Twist: 1/16" measured by a 1/16" feeler gauge and a straightedge extending from corner to corner of door face at stiles, top and bottom rails, and across both diagonals.

C. Refer to Door, Finish, and Hardware schedule for door types, size finish and hardware.

2.02 FABRICATION - SPECIFIC ITEMS

A. Solid Core Doors

1. Opaque finishes

a. Core: Solid wood core or mineral core when rated--standard to the manufacturer.

b. Thickness: As scheduled.

c. Match stile edge finishes to face finishes.

d. Field Paint Finish: to match Architect's sample. Coordinate with Section 09900 "Painting and Finishing".

B. All cross bands shall be sanded after gluing to sanded stile rail and particle board core assembly and prior to application of face veneer.

C. Edge bands shall be thoroughly kiln dried hardwood, to match finish on face of door.

D. Cross bands shall be a minimum of 1/16" thick, properly dried hardwood.

E. Edges in doors shall be beveled or radiused as noted.

2.03 PRE-FITTING AND PREPARATION FOR HARDWARE

A. Pre-fit, undercut as necessary, drill pilot holes for screws into particle board cores, and pre-machine wood doors at the factory.

B. Comply with the tolerance requirements of NWWDA for pre-fitting. Machine doors for hardware requiring cutting of doors. Refer to door schedules on drawings for hardware set numbers and to approved hardware schedule for detailed requirements. Coordinate with door frame shop drawings, and with hardware templates and other essential information required to ensure proper fit and uniform clearance of doors and hardware.

C. Coordinate with and make preparations for receipt and installation of security hardware including electromagnetic locks, if any.

D. Take accurate field measurements of hardware mortises in metal frames to verify dimensions and alignment before proceeding with machining in the factory.

PART 3 - EXECUTION

3.01 INSPECTION

A. Verify field dimensions and determine that door frames are of the correct type, suitably installed for proper hanging of doors, and notify the Contractor of conditions that might be detrimental to proper installation of wood doors.

B. Start of work in the field will signify acceptance of conditions as satisfactory for installation of wood doors.

3.02 INSTALLATION

A. For a minimum of 3 days prior to installation, condition wood doors to constant even average temperature and average prevailing moisture (humidity) conditions prevailing in installation areas before hanging. Doors shall not be subject to abnormal heat, dryness or humidity. Avoid sudden changes such as forced heat.

B. Field cutting, trimming, fitting, and machining of prefinished doors will not be permitted. Install doors in required openings as shown. Install flush panels with concealed fasteners.

C. Clearances: Provide clearances of maximum 1/8" at jambs and heads, maximum 1/8" at meeting stiles for pairs of doors and 1/4" from bottom of door to top of decorative floor finish or threshold, unless otherwise noted.

D. Apply hardware in accordance with hardware manufacturer's instructions and Section "Finish Hardware". Check and adjust operating finish hardware items just prior to final review. Leave work in complete and proper operating condition.

E. Adjust door installation to provide uniform clearance at heads and jambs and to contact stops uniformly. Remove and replace defective work including doors or frames which are found to be warped, bowed or otherwise damaged and cannot be properly fitted in frames.

3.03 PROTECTION

A. Protect doors and hardware during construction and after installation, and touch-up marred finishes in factory or in the field for perfect match with adjacent surfaces, to Architect's satisfaction, or replace damaged units.

B. Provide temporary replacement doors when requested until permanent replacements are installed, all at no additional cost to the Owner.

END OF SECTION

SECTION 08305

ACCESS PANELS

PART 1 - GENERAL

1.01 SUMMARY

A. Work of this Section is governed by General Conditions of the Contract and by provisions contained in Division 0 and Division 1 of these Specifications.

B. Work Included: This Section generally includes the following:

1. Flush, concealed, access panels in gypsum drywall where shown on drawings and as/or as otherwise required for the Work of this Contract and not provided as part of the work of related trades.

2. Flush, concealed access panels as required for the Work of this Contract and not provided as part of the work of related trades.

3. Provide access doors to service fire dampers, controls, access valves, cleanouts and all other equipment requiring access in walls and furred spaces.

4. Contractor shall coordinate the exact location, sizes and quantity with the Architect.

C. Related Work

1. Finish Hardware - Section 08700.

2. Gypsum Wallboard Systems - Section 09250.

3. Acoustical Ceilings - Section 09510.

4. Painting and Finishing - Section 09900.

5. Mechanical - Division 15 Specification Series.

1.02 SUBMITTALS

A. Product Data: Submit a minimum of 3 copies of manufacturer's technical data and installation instructions for each type of access door assembly.

B. Shop Drawings: Submit shop drawings for fabrication and installation of access panels and frames, including details of frame type, elevations of door design types, locations, anchorage and accessory items.

C. Submit copy of manufacturer's warranty for a period of one year from date of substantial completion.

1.03 QUALITY ASSURANCE

A. Fire-Resistance Ratings: When required by authorities having jurisdiction, provide appropriate fire-rated access door assemblies from manufacturer in Underwriters Laboratories, Inc.; "Building Materials Directory", with UL Label on access door.

B. Coordination: Furnish inserts and anchoring devices which must be built into other work for installation of access panels.

1.04 DELIVERY STORAGE AND HANDLING

A. Deliver materials specified herein in manufacturer's unopened containers, with manufacturer's name and point of origin on each container.

B. Handle and store in accordance with manufacturer's instructions and recommendations.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Provide access panels in drywall similar to type 3203 manufactured by Milcor or approved equal type by Karp Associates, Inc. or Inryco, Inc.

2.02 MATERIALS AND FABRICATION

A. Furnish each access door assembly manufactured as an integral unit, complete with all parts and ready for installation.

B. Steel Access Panels and Frames: Fabricate units of continuous welded steel construction. Grind weld smooth and flush. Furnish anchors and fasteners of type required to secure access panels.

C. Frames: Fabricate from minimum 16-gauge steel.

D. Recessed Panels: Fabricate from not less than 18-gauge sheet steel with panel recessed for thickness of applied finish. Reinforce panel to prevent buckling. Finish with manufacturer's standard shop primer.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Comply with manufacturer's instructions for installation of access panels. Coordinate installation with work of other trades.

B. Set frames accurately in position and securely attach to supports with face panels plumb or level in relation to adjacent finish.

3.02 ADJUST AND CLEAN

A. Adjust panels after installation for proper operation.

B. Remove and replace panels or frames which are damaged or defective.

END OF SECTION

SECTION 08450

TEMPERED GLASS DOORS

PART 1 - GENERAL

1.01 SUMMARY

A. Work of this Section is governed by General Conditions of the Contract and by provisions contained in Division 0 and Division 1 of these Specifications.

B. Work Included: This Section generally includes the following:

1. Tempered glass doors and sidelights inclusive of all hardware and accessories required for a complete installation.

2. Framing and supports.

C. Related Work

1. Miscellaneous metal - Section 05500.

2. Ornamental metal - Section 05700.

3 Hollow metal doors and frames - Section 08110.

4 Wood doors - Section 08200.

5 Finish hardware - Section 08700.

6. Glass and glazing - Section 08800.

7. Gypsum board systems - Section 09250.

8. Electrical - Refer to Electrical Drawings.

1.02 SUBMITTALS

A Product Data: Submit a minimum of 3 copies of manufacturer's specifications, standard details, and installation recommendations for glass door assemblies.

B. Shop Drawings: Submit shop drawings for fabrication and installation of glass doors including elevations, detail sections of composite members, hardware mounting heights, anchorage, reinforcement and glazing provisions, junctures with all adjacent materials.

C. Samples

1. Submit samples of stainless steel finishes: 6" square fittings, 6" long extrusion sections. Include 2 or more units in each set of samples to show range of finish variations.

2. Submit samples of glass type, showing edge finish where exposed.

D. Warranty: Submit manufacturer's standard warranty for a period of one year from date of substantial completion.

1.03 QUALITY ASSURANCE

A. Qualifications of Installers: For installation of glass doors and sidelights, use personnel who are trained and experienced in installation of the selected products and who are familiar with the requirements of this work. Installers shall have performed installations of equivalent scope and level of quality for a minimum of 5 years and shall submit a list of installations if requested by Architect.

1.04 PRODUCT HANDLING

A. Protection: Protect glass doors, sidelights and accessories before, during and after installation.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Provide glass doors and adjacent sidelights manufactured by Blumcraft or an approved equal.

2.02 MATERIALS

A. Glass: Clear glass for doors and sidelights shall be 5/8" thick for 8'-0" high or more doors or as otherwise noted or required..

B. Stainless Steel:

1. Materials and alloys shall conform to the applicable requirements of Section 05700 "Ornamental Metal".

2. Patch fittings and/or top and bottom rails shall be of sizes and styles shown on drawings. Finish shall be stainless steel matching Architect's control samples.

3. Sidelights (when applicable) shall be same thickness as doors unless otherwise indicated.

4. Hardware:

   a. Pivots/Closer: Dorma walking-beam top pivot and #BTS80BF center hung floor closer with delayed action closing for access by the physically challenged and 90 degree hold open except at elevator lobby doors. Provide floor pan when indicated. Provide extended spindles to accommodate recessing of floor closer so that cover plate may be set below carpet and carpet seam located at center of door opening to allow for service access as required.

   b. Electromagnetic lock: When applicable, shall be Installed in head of door, tied into Class E System, operated by Card Reader. Coordinate with Section 08700 "Finish Hardware" and Division 16 "Electrical". Provide Stainless steel valance to match fittings and/or rails. Coordinate with the applicable requirements of Section 05700 "Ornamental Metal".

   c. Push/Pull Handle: Refer to Section 08700.

   d. Finish shall be polished stainless steel, matching Architect's control sample.

5. Anchorages and Fastenings: Manufacturer's standard, concealed anchors. Finish heads of exposed fastenings, if acceptable to the Architect, shall match adjacent metal surfaces.

2.03 FABRICATION

A. Fabricate door and sidelight frames and rails in accordance with the applicable provisions of Section 05700 "Ornamental Metal".

B. Locate and provide holes and cutouts to receive hardware before tempering glass. Do not permit any cutting, drilling or other glass alterations after tempering.

C. Fabricate doors to accommodate hardware and accessory items as shown or specified.

3. *Sidelights (when applicable) shall be same thickness as doors unless* otherwise indicated.

4. Hardware:

   a. Pivots/Closer: Dorma walking-beam top pivot and #BTS80BF center hung floor closer with delayed action closing for access by the physically challenged and 90 degree hold open except at elevator lobby doors. Provide floor pan when indicated. Provide extended spindles to accommodate recessing of floor closer so that cover plate may be set below carpet and carpet seam located at center of door opening to allow for service access as required.

   b. Electromagnetic lock: When applicable, shall be Installed in head of door, tied into Class E System, operated by Card Reader. Coordinate with Section 08700 "Finish Hardware" and Division 16 "Electrical". Provide Stainless steel valance to match fittings and/or rails. Coordinate with the applicable requirements of Section 05700 "Ornamental Metal".

   c. Push/Pull Handle: Refer to Section 08700.

   d. Finish shall be polished stainless steel, matching Architect's control sample.

5. Anchorages and Fastenings: Manufacturer's standard, concealed anchors. Finish heads of exposed fastenings, if acceptable to the Architect, shall match adjacent metal surfaces.

2.03 FABRICATION

A. Fabricate door and sidelight frames and rails in accordance with the applicable provisions of Section 05700 "Ornamental Metal".

B. Locate and provide holes and cutouts to receive hardware before tempering glass. Do not permit any cutting, drilling or other glass alterations after tempering.

C. Fabricate doors to accommodate hardware and accessory items as shown or specified.

PART 3 - EXECUTION

3.01 INSPECTION

A. Examine the areas and conditions where glass doors are to be installed and notify the Architect of conditions detrimental to the proper and timely completion of the work.

B. Do not proceed with the work until unsatisfactory conditions have been corrected.

3.02 INSTALLATION

A. Install glass door and sidelight assemblies in accordance with the manufacturer's printed instructions and recommendations.

B. Set units level, plumb and true to line. Adjust operating hardware to ensure proper operation.

C. Coordinate with security devices and with the applicable requirements of Section 08700 "Finish Hardware".

3.03 ADJUST AND CLEAN

A. Adjust operating hardware to function properly, without binding.

B. Clean completed system, inside and out. Remove dirt, and other substances from surfaces.

C. Institute protective measures and other precautions required to ensure that glass doors will be without damage or deterioration at time of acceptance.

END OF SECTION

SECTION 08700

FINISH HARDWARE

PART 1 - GENERAL

1.01 SUMMARY

A. Work of this Section is governed by General Conditions of the Contract and by provisions contained in Division 0 and Division 1 of these Specifications.

B. Work Included: This Section generally includes the following:

1. Furnishing and installing finish hardware.

2. Furnishing and delivery of cylinders for all doors on the Project to the Building locksmith for keying.

3. Installation of cylinders for all doors on the Project after keying by Building locksmith is completed.

4. Cylinders for access panels where indicated or required.

5. Cylinders for closet doors and cabinets where indicated or required.

6. Coordination with other trades.

7. Adjustment, cleaning and protection.

8. Coordinate electric strike and magnetic locks with related work items indicated on Security Consultant's Drawings.

9. Masterkey locks to building Master System.

C. Work Not In Contract (NIC):

1. Security Package: Card Reader, Door Release Buttons, Door Monitors.

D. Related Work

1. Architectural woodwork - Section 06400.

2. Hollow metal doors and frames - Section 08110.

3. Wood Doors - Section 08200.

4. Access doors - Section 08305.

5. Tempered glass doors - Section 08450.

6. Gypsum Board Systems - Section 09250.

7. Electrical [automatic door operator wiring; security devices and wiring] - Refer to Electrical Drawings.

1.02 SUBMITTALS

A. Before any finish hardware is ordered or purchased, submit 3 catalog cuts of each item and a complete Schedule of Finish Hardware. Identify each item listed in this Schedule by manufacturer and brand, catalog number, material, and U. S. Standard finish designation. Note items to be furnished under other Sections.

B. Where submission differs from items in this Section, identify changes for the attention of the Architect.

C. Shop Drawings showing mounting heights and locations for each item.

D. Samples: Submit one sample of each item listed below, to indicate design, function and finish, labeled with catalog and typical set numbers. Do not proceed with ordering until samples have been approved. After approval, when no longer required for reference, samples may be installed in the work:

1. Hinges (each type).

2. Pivots (each type).

3. Closer and cover pan, each type,

4. Lockset with lever handle and rose.

5. Stop and holder (each type).

6. Flush bolts.

7. Deadlock.

8. Acoustical seals.

9. Push/pulls.

E. Templates: Promptly following approval of the Hardware Schedule by the Architect, and in ample time to avoid delays in fabrication, deliver templates, door and frame reinforcement recommendations, and installation information to the fabricators of items to receive finish hardware.

1.03 QUALITY ASSURANCE

A. Hardware shall be suitable for its required use and shall fit its designated location. Should any hardware specified be unsuitable or require modification to suit designated locations, determine the correction or modification necessary and notify the Architect in ample time to avoid delay in manufacture and delivery.

B. Supplier Qualifications: A recognized architectural finish hardware supplier, with warehousing facilities, who has been furnishing hardware in the Project's vicinity for a period of not less than 2 years, employing an experienced architectural hardware consultant who, at reasonable times during the course of the work, is available to Owner, Architect and Contractor for consultation about the Project's hardware requirements.

C. Barrier Free Requirements for Accessibility: Pressure required to be applied to the latch area to Interior doors which have a self-closing feature shall not exceed 5 pounds.

D. Coordinate hardware with door sizes, frames and stiles; thicknesses, type and rating to ensure proper fit and a flush, aligned installation. Coordinate locksets, latchsets, flush bolts, and similar items.

1.04 PRODUCT HANDLING

A. Pack finish hardware in manufacturer's containers, complete with bolts, screws, washers and other accessories required for installation. Label containers to indicate quantities and to identify contents and installation locations shown on the approved Hardware Schedule.

B. Before packing, individually wrap and protect lever handles, pulls and other items of finish hardware with easily damaged finishes.

C. Deliver, in ample time and in the order required for installation, to the building site and to the factories of metalwork fabricators.

D. Store on-site in a secure location.

1.05 JOB CONDITIONS

A. Field Service: Assign a competent representative, acceptable to the Architect, to be at the jobsite to check in each major shipment of finish hardware, to secure receipts covering each shipment, and to be available for call to the jobsite when, in the opinion of the Architect, his presence is necessary.

B. Cooperate and coordinate with other trades supplying materials or performing work in contact with, connecting to, underlying, or overlaying items specified in this Section.

C. Examine drawings and schedules covering the work of this Section and refer to other drawings, including Electrical and Security Drawings, which may affect the work of this Section or require coordination by this trade.

PART 2 - PRODUCTS

2.01 GENERAL

A. Requirements for design, grade, function, finish, size and other distinctive qualities of each type of finish hardware are indicated herein, and products are identified by manufacturers' names and catalog numbers.

B. References to these specific products are to establish minimum standards of function and quality, and equivalent substitutions may be proposed for approval by the Architect.

C. Provide hardware with finishes specified in the Hardware Schedule which are inclusive of the following:

1. US32D: Satin stainless steel.

2. US26D: Satin chrome plated finish.

3. 3.689: Aluminum painted.

4. AL: Aluminum.

D. With all items, furnish fasteners of appropriate matching finish where exposed.

2.02 HANGING ITEMS

A. Manufacturers and Catalog Numbers: Refer to Drawings.

1. Hinges:

a. Minimum of 3 hinges per door leaf up to 7'-6" high, and one additional hinge per 2'-6" or fraction thereof.

b. Types and materials to suit door weights, thicknesses and fire ratings.

c. Sizes selected for minimum projection from frame.

d. Concealed anti-friction or oil impregnated ball-bearings and button tips for doors with closers, elsewhere plain bearings and button tips, all with non-rising pins, non-removable on outward-opening doors.

2. Pivots

a. Coordinate spindle length with carpet height and door undercut. Provide extended spindles as required. Floor plate shall be installed under carpet.

2.03 CLOSING ITEMS

A. Manufacturers and Catalog Numbers: Refer to Drawings.

1. Surface mounted door closer: "Smoothee" #4040. Provide at active leaf only at pair of doors with flush bolts.

3. Pivots/Floor Closer: walking-beam top pivot and BTS80BF floor closer with delayed action closing for access by the disabled (and 90 degree hold open where indicated only). Provide floor pan to receive floor finish to match contiguous floor finish; and plywood substrate and underlayment [if required] to bring pan finish level with adjacent finish.

B. Surface mounted shall not be visible on the public side of doors. Provide with parallel arms and brackets to suit on doors opening into public spaces.

C. Size in accordance with manufacturers' standards to suit height, width and weight of door, and draft conditions.

2.04 LOCKING ITEMS

A. *Manufacturers and Catalog Numbers: Refer to Drawings.*

B. Furnish extended spindles to suit door thickness, and for doors where panel is applied to door.

C. Strikes: Furnish extended strikes where required to suit jamb detail.

D. Cylinders: Configured as required to match scheduled lockset and Building Master Key System.

E. Temporary Construction Masterkey System: Keyed to suit project requirements.

F. Keys and Keying System shall be coordinated with Owner with specific regard to *the following:*

1. Keying of locks differently.

2. Stamping keys and key blanks "Do Not Duplicate" and furnishing additional keys for each lock.

3. Keying Alike Locks.

4. Furnishing of key blanks.

5. Furnishing of Master Keys.

6. Providing key control system and cabinet. Determining location and capacity.

2.05 STOPPING ITEMS

A. Manufacturers and Catalog Numbers: Refer to Drawings.

B. Provide one stop at each leaf unless otherwise noted.

2.06 PUSHING AND PULLING ITEMS

A. Manufacturers and Catalog Numbers: Refer to Drawings.

B. Provide concealed fasteners where practical. Where exposed fasteners are required, provide countersunk, flush type finished to match push or pull.

2.08 MISCELLANEOUS ITEMS

A. Manufacturers and Catalog Numbers: Refer to Drawings.

B. Acoustical Seals: Mortised into door at jambs and heads.

C. Light Seal Weatherstripping: Surface mounted, at head and jambs.

D. Thresholds:

1. Drill and countersink units for anchor screws, located not more than 12" o.c. and not more than 3" from ends.

2. Cut accurately to length, and cope to fit tight against door frame after door frames have been installed and adjusted for proper door operation.

3. Cut thresholds to size and shape and grind smooth to remove burrs.

4. Miter corners to close exposed ends of threshold units which are not concealed by door frames, and return edge profile to faces of frames.

5. Provide mechanical hairline joints with concealed fastening or welded joints dressed smooth on exposed faces.

G. Silencers: For non-gasketed and non-weatherstripped frames, provide 3 silencers for each single door and 2 at head for each leaf at pair of doors unless approved submittals for doors indicate a different amount is required.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Install in accordance with recommendations of the manufacturers, before painting or finishing is complete. Remove or protect while painting or finishing is in progress, and reinstall or remove protection on completion.

3.02 MOUNTING POSITIONS

A. Heights above slab (0'-0") to center line, determined from benchmark datum. Mount items not listed at heights recommended by BHMA:

1. Locksets and Latchsets: 38" to center of lever handle, unless otherwise indicated.

2. Door Pulls: 40" to center of pull, unless otherwise indicated.

3. Top Hinge: To jamb manufacturer's standard, maximum 10" from head to center line of hinge.

4. Bottom Hinge: To jamb manufacturer's standard, maximum 12-1/2" from floor to center line of hinge, dimension constant for all doors.

5. Intermediate Hinges: Equally spaced between top and bottom hinges.

6. Hinge Mortise: 1/4" to 5/16" from stop face of door.

B. Door Stops: Surface or concealed overhead stops only where floor stops would be unsuitable.

3.03 ADJUST AND CLEAN

A. Make periodic checks during construction to verify that the finish hardware furnished has been installed correctly, and replace faulty units.

B. After completion of all construction work, clean, test all keys, lubricate as recommended by each manufacturer, and adjust finish hardware for smooth and easy operation.

C. Instruct Owner's personnel in the correct methods of adjusting, maintaining and cleaning finish hardware.

3.04 HARDWARE SETS

A. While the hardware schedule is intended to cover all doors, and establish a type and standard of quality, it shall be the specific duty and responsibility of the finish hardware supplier to examine Drawings and Specifications and furnish proper hardware for all openings whether listed or not. Any omissions in hardware groups in regard to regular doors shall be called to attention of Architect prior to bid opening for instructions; otherwise, list will be considered complete, No extras will be allowed.

END OF SECTION

SECTION 08800

GLASS AND GLAZING

PART 1 - GENERAL

1.01 SUMMARY

A. Work of this Section is governed by General Conditions of the Contract and by provisions contained in Division 0 and Division 1 of these Specifications.

B. Work Included: This Section generally includes the following:

1. Tempered glass panels for butt glazing, clear, thickness as indicated or as required to suit condition, as indicated on the Drawings and Schedules.

2. Mirror glazing, distortion-free, for frameless mirrors as indicated on the Drawings and finish schedule.

3. Glazing accessories and adhesives inclusive of setting blocks, edge blocks and gaskets, glazing channel at floor, joint cleaner, primer and sealer, glazing tape.

4. Coordination of glass and glazing material/fabrication/installation requirements with work of related trades; whose work includes glass and glazing as their responsibility i.e. Tempered Glass Doors.

5. Protection of glass to prevent resistance to finger marks and dirt during the course of construction.

C. Related Work

1. Rough carpentry - Section 06100.

2. Joint sealants - Section 07900.

3. Tempered glass doors - Section 08450.

4. Gypsum board systems - Section 09250.

1.02 REFERENCE STANDARDS

A. Comply with all pertinent recommendations contained in the "Manual of Glazing" of the National Glass Manufacturers Association (NGMA).

B. Prime Glass Standard: ASTM C 1036.

C. Safety Glass Standard: CPSC 16 CFR 1201 and ANSI Z97.1.

1.03 SUBMITTALS

A. Submit 12" x 12" samples of each type of glass specified.

B. Submit 12" long samples of each type of glazing component specified or required.

C. Submit manufacturer's technical data including installation certificate and maintenance instructions attesting that products comply with the specification requirements.

D. Submit complete shop drawings for all glass for Architect's review and acceptance. Indicate actual field dimensions and details at head, sill, and jamb. Show any field conditions causing non-level floor conditions at continuous glass office walls.

E. Submit manufacturer's warranties for each glass type specified herein.

1.04 QUALITY ASSURANCE

A. Single Source Responsibility for Glass: To ensure consistent quality of appearance and performance, provide materials produced by a single manufacturer or fabricator for each kind and condition of glass.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to the site ready for use in the manufacturer's original and unopened containers and packaging, bearing labels as to type, manufacturer and brand. Delivered materials shall be identical to approved samples.

B. Store materials under cover in a dry and clean location, off the ground. Remove materials which are damaged or otherwise not suitable for installation and replace with acceptable materials.

C. Factory label each glass lite. Labels shall not be removed until after the installation has been approved.

D. Remove glass that is cracked, broken, chipped, or otherwise damaged from the job site and replace with new material. Glass surfaces which display streak lines or other imperfections will be considered unacceptable and shall be replaced.

1.06 WARRANTY

A. Warrant glass and glazing for a period of one year from date of Final Completion.

B. Mirrors: Warrant mirrors against silver spoilage for a period of 15 years after date of acceptance.

PART 2 - PRODUCTS

2.01 GLASS PRODUCTS

A. Clear Float Glass: Type I (transparent glass, flat), Class I (clear), Quality q3 (glazing select), and optical quality where indicated.

B. Tempered Glass Products: Prime glass which has been heat treated to strengthen glass to not less than 4.5 times annealed strength.

C. Mirror Glass: ASTM C 1036, Type I, Class I, quality q2., Kind FT. Provide silvering, copper backing and double protective heat catalyzed paint coating on entire back surface of mirror carrying a fifteen year guarantee against silver spoilage.

2.02 GLAZING SEALANTS AND COMPONENTS

A. Elastomeric Sealant Standard: Provide manufacturer's standard chemically curing, clear, elastomeric sealant of base polymer indicated, complying with ASTM C 920 requirements including those for type, grade, class and use.

B. Preformed Butyl-Polyisobutylene Glazing Tape: Provide standard solvent-free, non-staining and non-migrating tape as recommended for application indicated.

C. Setting Blocks: Neoprene, EPDM or silicone blocks as required for compatibility with glazing sealants, 80 or 90 Shore A durometer hardness.

D. Edge Blocks or Spacers: Neoprene or EPDM, 40 - 60 durometer hardness, having proven compatibility with sealants used.

E. Compressible Filler Rod: Closed-cell or waterproof-jacketed rod stock of synthetic rubber or plastic foam, proven to be compatible with sealants used. Not to be used in the glazing rabbet.

F. Cleaners, Primers and Sealers: Type recommended by manufacturers of sealant or gasket.

G. Mirror Mastic: An adhesive setting compound manufactured specifically for setting mirrors with a support at bottom edge over plywood substrate. Coordinate with Section 06100 "Rough Carpentry".

H. Sealant for Butt Glazing: GE Silicone Constructiuon Sealant Silglaze II. Coordinate with the applicable requirements of Section 07900 "Joint Sealants".

2.03 FABRICATION

A. Cut panes to size in shop, and pencil and polish exposed edges and cutouts where indicated and/or as required.

B. Fabricate glass in sizes and thicknesses shown, in single pieces unless otherwise noted, with edge clearances and tolerances recommended by glass manufacturer.

C. Provide all glass productions in thicknesses indicated and as recommended by the manufacturer.

PART 3 - EXECUTION

3.01 INSPECTION

A. Examine the areas and conditions where glass and glazing are to be installed and notify the Contractor of conditions detrimental to the completion of the work.

B. Do not proceed with the work until unsatisfactory conditions have been corrected.

C. Verify all glass sizes and clearances. Verify, at the job site, those dimensions affecting the work. Bring variant field dimensions to the attention of the Architect and Contractor. Obtain decision regarding corrective measures before the start of installation.

D. Inspect each piece of glass immediately before installation. Do not install any pieces which are improperly sized or have damaged edges, scratches or abrasion or other evidence of damage.

3.02 PREPARATION

A. Comply with manufacturer's instructions for preparation for primer and glazing compounds and tapes.

B. Clean glazing channels and other framing members to receive glass, immediately before glazing. Remove coatings which are not firmly bonded to substrates. Remove lacquer from metal surfaces where elastomeric sealants are indicated for use.

3.03 GLAZING, GENERAL

A. Comply with combined printed recommendations of manufacturers , except where more stringent requirements are indicated, including those of referenced glazing standards.

1. Glazing channel dimensions are intended to provide for necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances. Adjust as required by job conditions at time of installation.

2. Protect glass from damage. Remove and dispose of glass units with damage or imperfections of kind that impairs performance or appearance.

3.04 INSTALLATION

A. Install setting blocks and spacers of proper size and spacing at appropriate locations. Set blocks in thin course of sealant which is acceptable for heel bead

use. Provide spacers for glass sizes larger than 50 united inches (length plus height), except where gaskets or glazing tapes are used for glazing.

B. Set units of glass in each series with uniformity of pattern, draw, bow and similar characteristics.

C. Set edge blocks located in glazing rebate as recommended by the glass manufacturer, to insure against displacement of the glass and against metal to glass contact in the rebate, and to ensure permanently adequate bite of the glass within the glazing system.

D. Set glass in a manner which produces greatest possible degree of uniformity of appearance.

E. Do not use (2) different glazing materials in the same joint system unless the manufacturer of each material has stated in writing that his material is fully compatible with the related material.

F. Butt or lap ends of tapes in accordance with manufacturer's recommendations.

G. Tool exposed surfaces of sealants to provide a substantial "wash" away from glass. Install pressurized tapes and gaskets to protrude slightly out of channel, so as to eliminate dirt and moisture pockets.

H. Provide minimum gap at butt joints, to be field caulked with minimum concave bead of clear silicone in a single piece with no joints.

I. Mirror Glazing

1. Paint back of mirror with an additional coat of moisture-resistant paint of the type recommended by the mirror manufacturer. Support mirror on setting blocks or continuous glazing gasket.
2. Apply mirror mastic in accordance with mastic manufacturer's instructions. Do not cover more than 25% of mirror back.

3. Apply mirror to substrate so that areas not covered with mastic will remain open for ventilation, with 1/8" minimum clearance from substrate. Provide temporary rigid support until adhesive has set.

3.05 PROTECTION

A. Protect glass from breakage immediately upon installation by use of crossed streamers attached to framing and held away from glass. Do not apply markers to surfaces of glass. Remove non-permanent labels and clean surfaces.

B. Remove and replace glass which is broken, chipped, cracked, abraded or damaged in other ways during construction period, including natural causes, accidents and vandalism.

C. Wash and polish glass on both faces not more than 4 days prior to date scheduled for inspections intended to establish date of Substantial Completion in each area of

project. Comply with glass product manufacturer's recommendations or final cleaning.

END OF SECTION

SECTION 09250

GYPSUM BOARD SYSTEMS

PART 1 - GENERAL

1.01 SUMMARY

A. Work of this Section is governed by General Conditions of the Contract and by provisions contained in Division 0 and Division 1 of these Specifications.

B. Work Included: This Section generally includes the following:

1. Gypsum board work for partitions, ceilings, furring, and related items as shown on Drawings.

2. Skim coat of gypsum board work with joint compound.

3. Fire rated gypsum board where indicated on the Drawings.

4. Water resistant wall board where indicated on the Drawings. Cement backer board where indicated on Drawings and schedules.

5. Acoustical insulation for gypsum board systems.

6. Acoustical sealants for gypsum board systems.

7. Taping and finishing of gypsum board joints.

8. Bracing and connections.

9. Sheet metal reinforcement of gypsum wallboard partitions for wall hung items of related trades as indicated and as required.

10. 5/8" plywood reinforcement of gypsum wallboard partitions for wall hung items of related trades as indicated and as required.

11. Metal plate blocking reinforcement of gypsum wallboard partitions for wall hung furnishings which are furnished by the Owner for installation under another Contract. Coordination is required between the various parties to ensure sufficient reinforcement for all items.

12. 3/4" plywood backer boards for telephone and security closets is specified in Section 06100.

13. Installing rings and frames in gypsum board surfaces for grilles, registers and lighting fixtures.

14. Installing access panels furnished by other trades.

15. Metal reveals, trim reveal, edge trim, wall reveal. Provide field mockups of metal reveals as directed by the Architect.

16. *Coordination with work of related trades to ensure timely integration and* coordination of such items as linear diffusers which require a specific sequence in installation procedures.

17. Preparation of gypsum wallboard as required to receive Artisan Wall Finish as provided under Section 09920. Coordinate accordingly with specific regard to preparation required.

C. Related Work

1. Rough and finish carpentry - Section 06100.

2. Joint sealants - Section 07900.

3. Glass and glazing - Section 08800.

4. Access panels - Section 08305.

5. Tile Work - Section 09300.

6. Acoustical ceilings - Section 09510.

7. Interior stonework - Section 09630.

8. Painting and finishing - Section 09900.

9. Artisan wall finish - Section 09920.

10. Mechanical items - Division 15 Specification Series.

11. Electrical items - Division 16 Specification Series.

1.02 REFERENCE STANDARDS

A. Gypsum Drywall Construction Handbook, latest edition, US Gypsum Co.

B. GA-216 and GA-505 by Gypsum Association.

C. ASTM C36 for gypsum boards; ASTM C630 for water resistant board.

D. Metal Support Standards: ASTM C645 and C754.

1.03 SUBMITTALS

A. Shop Drawings:

1. Each gypsum board partition, furring and ceiling system showing size and gauges of framing members, gypsum board types, insulation, sealant, methods of assembly and fastening, control joints indicating column lines, corner details, joint finishing and relationship of gypsum board work to adjacent work.

2. Details of all unusual conditions in connection with gypsum drywall construction.

3. Proposed location of control joints required but not shown.

4. Location of access doors in gypsum wallboard construction.

5. Location and type of reinforcing in gypsum wallboard construction to support furnishings; furnished by Owner and installed under another contract--by others.

B. Samples: Submit 6" long samples of metal trim pieces.

C. Manufacturer's Literature: Submit technical and installation instructions for each product specified.

1.04 QUALITY ASSURANCE

A. Allowable Tolerances

1. 1/32" offsets between plains of board faces, and 1/16" in 8'-0" for plumb, level, warp and bow.

2. Provide standard gypsum board assemblies designed and tested by manufacturer to withstand a lateral load of 5 lbs. per sq. ft. for the maximum wall height required, and with deflection limited to l/360 of partition height.

B. Installer Qualifications: Firm with not less than 5 years of successful experience in the installation of specified gypsum board systems.

C. Color Quality Control: To ensure color match, coordination is required between gypsum wallboard systems and related trades: i.e. air diffusers, metal perforated pans, air diffusers, and sprinkler heads.

1.05 DELIVERY, STORAGE AND HANDLING

A. Deliver materials in original packaging, bearing brand names and identification of manufacturer or supplier.

B. Store materials to keep them dry and protected from soiling, dirt or damage. Neatly stack gypsum boards flat with shims to allow air circulation and to prevent sagging.

C. Handle gypsum boards to prevent damage to edges, ends or surfaces. Protect trim accessories from being bent or damaged.

1.06 JOB CONDITIONS

A. Environmental Conditions, General: Comply with requirements of gypsum board application standards and manufacturer. Do not begin work until exterior openings are enclosed.

1. Temperature: Maintain temperature of not less than 55 deg. for at least 48 hours, prior to, during and after installation of gypsum board work.

2. Ventilation: Provide and maintain adequate ventilation to eliminate excessive moisture in the area of the gypsum board work for at least 24 hours, prior to, during and after installation of gypsum board work.

1.07 JOB MOCK-UP

A. At a suitable location at the project, where directed by the Architect, construct a portion of a wall and ceiling, including metal reveals and detail against abutting construction, demonstrating the quality of work and finish to be obtained under this Section.

B. Schedule meeting between the Architect, the subcontractor responsible for gypsum board installation and finishing and the painting subcontractor, to approve Job Mock-Ups as representatives of minimum conditions of gypsum board substrate to be painted.

C. Provide at least 72 hours advance notice to participants prior to convening meeting.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Proprietary wallboard products specified are manufactured by United States Gypsum Corporation. Provide either specified products or their equivalent as manufactured by Domtar Gypsum. Provide metal components as manufactured by Unimast.

2.02 MATERIALS

A. Partition Framing System: ASTM C 645; 25 gauge (minimum), heavier gauge where required to support applied loadings or where floor to floor ceiling height exceeds manufacturer's recommended criteria.

1. *Studs: Standard sizes as shown. Limiting heights as hereinbefore specified* and in accordance with manufacturer's recommendations.

2. Runners: Match studs; type recommended by stud manufacturer.

3. Fasteners: Type and size recommended by framing system manufacturer for the application indicated.

4. Furring: Cold-rolled, hat shaped sections of minimum 25 gauge corrosion resistant steel.

B. Ceiling Support Materials and Systems

1. General: Size ceiling support components to comply with ASTM C 754 and with Reference Standard 5-16 of the New York City Building Code.

2. Main Runners: Steel channels with rust inhibitive paint finish, hot or cold rolled.

3. Furring: Cold-rolled, hat shaped sections of minimum 25 gauge corrosion resistant steel.

4. Hanger Rods and Flats: Mild steel, zinc or cadmium plated or protected with rust inhibitive primer.

5. Fasteners: Galvanized steel screws, of length suitable for adequate penetration of the substrate.

C. Gypsum Board Products

1. Gypsum Board: 5/8" thick unless otherwise noted, "Sheetrock", 48" wide, in maximum lengths available to minimize end to end butt joints.

2. Water Resistant Gypsum Board: 5/8" thick, "Sheetrock W/R" or "Sheetrock Firecode C W/R", 48" wide, in maximum lengths available to minimize end to end butt joints.

3. Fire Rated Gypsum Board 5/8" thick "Sheetrock Firecode C", 48" wide, in maximum lengths available to minimize end to end butt joints.

4. Cement Backer Board: "Durock Tile Backer Board".

D. Trim Accessories

1. Corner Beads: For 90 degree external Corners - "Dur-A-Bead" No. 103, 27 U.S. Standard gauge. galvanized steel, 1-1/4" x 1-1/4".

2. Edge Beads: "Metal Trim No. 200A", 28 U.S. Standard gauge. galvanized steel, channel type, or "Metal Trim No 200B", L type, where use of channel type (200A) is not possible.

3. Square-Edged Casing Beads: Manufacturer's standard with expanded or short flange to suit application.

4. Control Joints: No. 093.

F. Joint Treatment Materials

1. "Perf-A-Tape" for joint reinforcing, 2" glass fiber tape for tile backer board..

2. "Durabond 90 Joint Compound-Multi-Purpose" for taping and topping, water resistant type where required.

3. "Ready Mixed Compound-Topping" for finishing and skim coat.

G. Miscellaneous Items

1. Acoustic Insulation: Paperless, non-combustible, semi-rigid mineral fiber mat, 2" thick, in partitions (unless otherwise indicated), 3 lb./cu. ft. maximum density; USG's "Thermafiber", or equivalent.

2. Fasteners for Gypsum Board: Type and size recommended by furring manufacturer for the substrate and application indicated.

3. Laminating Adhesive: USG's "Perf-A-Joint Compound".

4. Water: Clean, fresh and suitable for drinking.

5. Brackets: Provide 20 gauge steel furring brackets unless greater gauge is required to meet loading requirements of grab bars and other items requiring support.

6. Sealant: "USG Acoustical Sealant".

7. Vapor Retarder: As recommended by the manufacturer, subject to Architect's acceptance.

8. Neoprene Gaskets: Conform to ASTM D1056. Neoprene Gaskets shall be quarter inch thickness compressed to 1/8 inch during installation.

9. Sheet Metal: Provide continuous 25 gauge, 6" wide sheet steel wall plate. Screw wall plate to studs for support of toilet accessories, casework and other items supported on gypsum board.

10. Metal plate blocking: Provide continuous 25 gauge, sheet steel wall plate blocking the full size [length and width] of unit plus 2" on all sides. Screw wall plate to studs for support of furniture items supported on gypsum board.

11. Vinyl Reveal at Window Wall: Type as selected by the Architect.

PART 3 - EXECUTION

3.01 INSPECTION

A. Examine the areas and conditions where gypsum board systems are to be installed and notify the Architect of conditions detrimental to the proper and timely completion of the work.

B. Do not proceed with the work until unsatisfactory conditions have been corrected.

3.02 FRAMING, GENERAL

A. Install supplementary framing and bracing at terminations in the work and for support of toilet accessories, railings and other construction.

B. Isolate steel framing from building structure to prevent transfer of structural loading, at locations indicated below.

1. Where edges of suspended ceilings abut building structure.

2. Where partition and wall framing abuts overhead structure.

C. Do not bridge building expansion joints with steel framing, frame both sides of joints with furring and other support as indicated.

3.03 PARTITION AND WALL FRAMING

A. Install runner tracks at floors, and structural walls and columns where gypsum board stud system abuts other work. At exterior walls, install asphalt felt strips between wall and framing.

B. Use channel type studs, positioned vertically in runners, spaced as noted on drawings, but not more than 24 " o.c.

C. Anchoring

1. Anchor studs to floor runners with screw fasteners.

2. At ceiling runners anchor studs with snap-in connections leaving space for movement.

3. Anchor studs at partition intersections, partition corners and where partition abuts other construction with sheet metal screws through each stud, floor and ceiling runner flange.

D. Seal studs abutting existing and/or other construction with neoprene gasket continuously between stud and abutting construction, minimum 1/8" unless otherwise noted.

E. Install metal stud horizontal bracing wherever vertical studs are cut or wallboard is cut for passage of pipes, ducts or other penetrations, and anchor horizontal bracing to vertical studs with sheet metal screws.

F. At jambs of door frames install doubled-up studs (back to back) from floor to underside of structural deck, and securely anchor studs to jamb anchors of frames and to runners with screws.

G. Over heads of door frames install cut-to-length section of runner with flanges slit and web bent to allow flanges to overlap adjacent vertical studs, and anchor runner to adjacent vertical studs with sheet metal screws.

3.04 CEILING FRAMING

A. Space main runners 4' - 0" o.c. and space hangers 4' - 0" o.c. at runners.

B. Level main runners to a tolerance of 1/8" in 12' -0" measured both lengthwise on each runner and transversely between parallel runners.

C. Wire-tie or clip furring members to supports.

D. Space ceiling furring members 16" o.c.

E. Provide sufficient supplementary framing on each side of light fixtures, grilles and other items penetrating the ceiling.

3.05 GYPSUM BOARD APPLICATION

A. Refer to drawings for locations of gypsum board types and as follows:

1. Use fire-rated gypsum board for fire rated assemblies.

2. Use water-resistant gypsum board where indicated on Drawings and where gypsum board would be subject to moisture and tile backer board is not shown.

3. Install water-resistant gypsum board in full, large sheets (no scraps) to limit *number of butt joints.*

B. Apply gypsum board with long dimension parallel to stud framing members, and with abutting edges occurring over stud flanges Joints on opposite sides of a partition shall be so arranged as to occur on different studs..

C. Install gypsum board for partitions from floor to underside of structure above and secure rigidly in place by screw attachment, unless otherwise indicated.

D. Neatly cut gypsum board to fit around outlets, switch boxes, framed openings, piping, ducts, and other items which penetrate gypsum board; fill gaps with acoustical sealant.

E. Second Layer Application: Screw attach second gypsum board layer, unless laminating method of attachment is indicated on drawings or is necessary to obtain required sound rating or fire rating. Overlap joints of first layer.

3.07 SEALANT APPLICATION

A. Install continuous acoustical sealant bead at top and bottom edges of all gypsum board for sound rating as gypsum board is installed, and between metal trim edge beads and abutting construction.

B. Install acoustical sealant in vertical control joints within the length of partition, and in all other joints, as specified below under "Control Joints".

C. Install bead of acoustical sealant around electric switch and outlet boxes, piping, ducts, and around any other penetrations in gypsum boards.

D. Where sealant is exposed to view, protect adjacent surfaces from damage and from sealant material, and tool sealant flush with and in same plane as gypsum board surface. Sealant beads shall be 1/4" to 3/8" diameter.

3.08 METAL TRIM APPLICATION

A. Install metal trim in accordance with manufacturer's instructions. Finish with 3 coats of joint compound, feathered and finish sanded smooth with adjacent gypsum board surfaces.

1. Corner Beads: Install specified corner beads in single lengths at all external corners, unless corner lengths exceed standard stock lengths.

2. Edge Beads: Install specified edge beads in single lengths at all terminating edges of gypsum board exposed to view, where edges abut dissimilar materials and elsewhere where shown.

3. Casing beads shall be set in long lengths, neatly butted at joints. Provide casing beads at juncture of board and vertical surfaces and at exposed perimeters.

4. Reveals: Install specified reveals in single lengths where shown on Drawings.

3.09 CONTROL JOINT LOCATIONS

A. Gypsum board surfaces shall be isolated with control joints where:

1. Partition abuts a structural element or dissimilar wall or ceiling.

2. *Ceiling abuts a structural element, dissimilar wall or other vertical penetration.*

3. Construction changes within the plane of the partition or ceiling.

4. Shown on final shop drawings.

5. Ceiling dimensions exceed 50 feet in either direction.

6. Wall dimensions exceed 30 feet in either direction.

7. Wings of "L", "U", and "T" shaped ceiling areas are joined.

8. Expansion or control joints occur in the structural elements of the building.

3.10 FINISHING

A. Apply joint compound in 3 coats, feathered and finish surface sanded smooth with adjacent gypsum board surface, in accordance with manufacturer's instructions. Apply joint compound as recommended by the manufacturer for the respective wall board type of at the following locations:

1. Joints between face gypsum boards in the same plane.

2. Joints at internal corners of intersecting partitions.

3. Joints at internal corners of intersections between ceilings and walls or partitions.

4. Screw heads and other depressions.

5. Skim coat of joint compound over gypsum board surfaces.

3.11 PROTECTION

A. Provide protection to keep gypsum board work from damage until time of substantial completion.

B. Work shall be left in clean condition ready for painting, artisan wall finish, or fabric wrapped panels.

END OF SECTION

SECTION 09300

TILE WORK

PART 1 - GENERAL

1.01 SUMMARY

A. Work of this Section is governed by General Conditions of the Contract and by provisions contained in Division 0 and Division 1 of these Specifications.

B. Work Included: This Section generally includes the following:

1. Ceramic wall tile where indicated on Drawings and schedules.

2. Setting materials and grout work.

C. Related Work

1. Joint sealants - Section 07900.

2. Gypsum Board Systems - Section 09250.

3. Interior Stonework - Section 09630.

4. Metal toilet partitions - Section 10160.

5. Toilet accessories - Section 10800.

D. Work Not In Contract (NIC)

1. Resilient Flooring and Base Covering - Section 09650.

1.02 REFERENCE STANDARDS

A. Tile Council of America (TCA) "Handbook for Ceramic Tile Installation".

B. ANSI A137.1 "American National Standard Specifications for Ceramic Tile".

C. ANSI A108.5 "Installation of Ceramic Tile With Dry-Set Portland Cement Mortar or Latex-Portland Cement Mortar".

1.03 SUBMITTALS

A. Product Data: Submit a minimum of 3 copies of manufacturer's technical information and installation instructions for materials required, except bulk materials.

B. Shop drawings showing tile pattern layout in running bond and indicating starting point for pattern in each area to receive tile. Indicate which spaces will have tiles laid out in the field, as called for in 3.03, for Architect's approval before setting.

C. Samples

1. Submit grouted samples of each color and texture of tile required, not less than 12" x 12", on plywood or hardboard backing.

2. Submit full size sample of each type and color of trim and accessory.

3. Submit full range of sample grout colors.

1.04 QUALITY ASSURANCE

A. Installer Qualifications: Firm with a minimum of 5 years experience in the installation of materials specified, on comparable projects and having approval of materials manufacturer.

B. Provide materials obtained from one source for each type and color of tile, grout, and setting materials.

C. Each type of tile used in a room shall be from the same production run.

1.05 DELIVERY, STORAGE AND HANDLING

A. Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use. Prevent damage or contamination to materials by water, freezing, foreign matter or other causes.

B. Proprietary Materials: Handle, store, mix and apply proprietary setting and grouting materials in compliance with manufacturer's instructions.

1.06 PROJECT CONDITIONS

A. Maintain environmental conditions and protect work during and after installation to comply with referenced standards and manufacturer's printed recommendations.

B. Maintain temperatures at not less than 50 deg. F in tiled areas during installation and for 7 days after completion, unless higher temperatures required by referenced installation standard or manufacturer's instructions.

1.07 ATTIC STOCK

A. Furnish 5% additional stock of all tile types and sizes.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS/PRODUCTS

A. Ceramic wall tile: Refer to Drawings and Schedules.

2.02 SETTING MATERIALS

A. Portland Cement: ASTM C150 Type 1.

B. Sand: ASTM C144.

C. Latex-Portland Cement Mortar: Latex portland cement mortar complying with ANSI A118.4.; Laticrete International, Inc: 4237 thin set mortar additive with 211 Crete Filler Powder.

D. Water: Clear and without deleterious substances which would impair the work.

2.03 GROUTING MATERIALS

A. Grout: Type and color as selected by Architect complying with ANSI A118.6.

B. Latex-Portland Cement Grout: Proprietary compound composed of Portland cement with latex additive for a more flexible and less permeable grout; color to match adjacent tile unless noted otherwise; as manufactured by Laticrete International, Inc. with latex additive.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine the substrates, adjoining construction and the conditions under which tile is to be installed. Do not proceed with the Work until unsatisfactory conditions have been corrected.

B. Allowable Variations in Substrate Levels: Same as allowable variation in finished work.

3.02 PREPARATION

A. Clean all other substrates as required to remove deleterious substances that might impair the work.

3.03 PATTERN LAYOUT

A. Lay out tile work in patterns shown using field tile and trim shapes as shown or required. Unless otherwise shown on the drawings, center tile fields both directions in each space or on each wall area and adjust to minimize tile cutting. Use uniform joint widths of 1/16". Cut field tile, not trim shapes, unless otherwise shown.

B. In areas designated on shop drawings, place dry tiles in patterns indicated, and schedule a meeting with the Architect for timely inspection, and adjustment if required, before tile installation.

C. Conform to approved pattern layouts on final shop drawings. Wall tile shall be set *in running bond pattern.*

3.04 PLACEMENT METHODS

A. Install tile and accessories using the following setting methods for the types of tile at locations indicated:

1. Walls - Thin set on cement backer board: TCA Method W 243, latex portland cement mortar with latex portland cement grout. Use in areas with temperatures not to exceed 140 deg. F.

3.05 INSTALLATION, GENERAL

A. Allowable Variations in Finished Work: Do not exceed the following deviations from level and plumb, and from elevations, locations, slopes and alignments shown:

1. Walls: 1/8" in an 8' run, any direction; ±1/8" at any location; 1/32" offset at any location.

2. Joints: ±1/32" joint width variation at any location; 1/16" in a 3' run for deviation from plumb and true, and for other variations in alignment of joints.

B. Extend tile work into recesses and around fixtures in the spaces shown or scheduled to receive tile. Form a complete covering without interruptions except

for control and expansion joints [if any] as shown and as required to comply with requirements. Terminate work at obstructions, edges and corners without disruption of pattern or joint alignments.

C. Grouting: Grout tile to comply with referenced installation standards, using grout materials indicated.

3.06 CLEANING AND PROTECTION

A. Cleaning

1. Upon completion of placement and grouting, clean all tile surfaces free of foreign matter.

2. Tile may be cleaned with acid solutions only when permitted by tile and grout manufacturer's printed instructions, but not within 14 days after installation. *Protect metal surfaces, and plumbing fixtures from effects of acid cleaning.* Flush surface with clean water before and after cleaning.

B. Protection

1. When recommended by tile manufacturer, apply a protective coat of neutral protective cleaner to completed tile walls. Protect installed tile work with Kraft paper or other heavy covering during construction period to prevent damage and wear.

3. Before final inspection, remove protective coverings and rinse neutral cleaner from tile surfaces.

END OF SECTION

SECTION 09510

ACOUSTICAL CEILINGS

PART 1 - GENERAL

1.01 SUMMARY

A. Work of this Section is governed by General Conditions of the Contract and by provisions contained in Division 0 and Division 1 of these Specifications.

B. Work Included: This Section generally includes the following:

1. Acoustical tile installed on an exposed tee grid suspension system as indicated on the Drawings and schedules.

2. Primary suspension system.

3. Coordinate with and make provisions for the installation of lighting fixtures, diffusers, grilles and similar items provided under other Sections.

4. Cutting, drilling, scribing and fitting as required for electrical and mechanical penetrations.

5. Perimeter and column angle mouldings, angle shape; trim and accessories for acoustical ceilings.

C. Related Work

1. Gypsum board systems - Section 09250.

2. Diffusers, grilles and related frames - Division 15.

3. Lighting fixtures, alarms and other electrical items - Division 16.

1.02 REFERENCE STANDARDS

A. Codes and Standards: Comply with pertinent requirements of authorities having jurisdiction and with recommendations of the Ceilings and Interior Contractor's Association.

1.03 SUBMITTALS

A. Shop Drawings: Submit shop drawings showing details of construction, reflected ceiling plans showing layout of supports, sizes, and supporting members and relationship to work of other sections; including partitions.

B. Calculations: Submit calculations signed by an engineer licensed in the State of New York to substantiate ability to support contingent partition work (if required).

C. Samples and Product Literature: Submit the following samples and related manufacturer's descriptive literature.

1. Acoustical Units: (3) full size, each type.

2. Grid and Mouldings: (3) 12" long components, each type.

1.04 QUALITY ASSURANCE

A. Installer Qualifications: Firm with a minimum of 5 years experience in the installation of materials specified, on comparable projects and having approval of materials manufacturer.

B. Source Quality Control: Acoustical units shall be produced from the same "lot" for each type.

C. Cutting of tiles in the field is unacceptable.

1.05 DELIVERY, STORAGE AND HANDLING

A. Deliver acoustical units and suspension materials in original, unopened packages, stored to protect against damage from moisture, direct sunlight, surface contamination, or other causes.

B. Handle units to avoid chipping or other damage.

1.06 COORDINATION

A. Coordinate layout and installation of acoustical ceiling units and suspension system components with other work, supported by, or penetrating through ceilings, including light fixtures, HVAC, fire suppression system components, and partitions.

1.07 PROJECT CONDITIONS

A. Do not install acoustical ceilings until work above ceilings is completed and ambient conditions of temperature and humidity will be continuously maintained at values near those indicated for final occupancy.

1.08 ATTIC STOCK

A. Upon completion and acceptance of the work, 400 square feet of each tile type and size are required as attic stock.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Provide acoustical ceiling systems (units and grid) of sizes, types, and textures as indicated. Proprietary products are specified hereinafter.

2.02 SUSPENSION SYSTEMS

A. Primary Suspension System

1. General: Size ceiling support components to comply with ASTM C754 and with Reference Standard 5-16 of the New York City Building Code.

2. Main Runners: Steel channels with rust inhibitive paint finish, hot or cold rolled.

3. Hangers: Mild steel, zinc, cadmium plated or protected with rust inhibitive primer.

4. Hanger Anchorage Devices: Shot-in anchors, screws, clips, bolts or other applicable devices acceptable to the New York City Department of Buildings. Provide devices sized by licensed engineer, complying with requirements of local governing authorities.

B. Secondary Suspension Systems

1. Where indicated, provide steel exposed tee grid suspension system: "Supra Fine ML 8/16" as manufactured by Armstrong World Industries.

a. Profile: Exposed Tee

c. Duty Classification: Intermediate duty

d. Cross Tee/Main Beam interface: Butt-edge.

e. Provide field punching of grid as required.

C. Furring Members: ASTM C 645; 0.0179" minimum thickness, hat-shaped; "C"-shaped studs for spans of more than 4 feet.

1. Furring Anchorages: 16-gage galvanized clips and anchorages recommended by furring manufacturer.

2.03 ACOUSTICAL UNITS

A. Provide acoustical units as indicated on the Drawings :

ACT-1	MFG:	USG Interiors
	DESCRIPTION:	Acoustical ceiling tile
	MODEL:	Mars Plimaplus 86185
	COLOR:	White
	SIZE:	24" x 24"
	LOCATION:	General Areas

PART 3 - EXECUTION

3.01 INSPECTION

A. Examine the areas and conditions where acoustical ceilings are to be installed and notify the Architect of conditions detrimental to the proper and timely completion of the work.

B. Do not proceed with the work until unsatisfactory conditions have been corrected.

3.02 PREPARATION

A. Measure each ceiling area and establish layout of acoustical units to balance border widths at opposite edges of each ceiling; avoid use of less-than-half width units at borders.

3.03 INSTALLATION

A. General: Install materials in accordance with manufacturer's instructions, governing regulations and in compliance with reflected ceiling plans.

B. Primary Suspension System: Install primary suspension system to comply with ASTM C636, using hangers supported from building structural members.

C. Secondary Suspension Systems: Attach concealed main runners to primary carrying channels with channel clamps. Insert cross-tees into main runners and insert accessible tiles in cross-tees.

1. Scribe and cut acoustical units to fit accurately at borders and penetrations.

D. Install angle edge mouldings at edges of acoustical ceiling and at other areas where edges of acoustical units would otherwise be exposed after completion of the work.

1. Level mouldings with ceiling suspension system, to a level tolerance of 1/8" in 12'- 0".

E. Where lighting fixtures, access doors diffusers, registers, etc., are to be suspended from ceiling construction, their reinforcement, hangers, and other mounting devices shall be provided under work of this Section.

F. Allowable Tolerances: Ceilings shall be 1/8" in 10'-0" run, any location, non-cumulative.

3.04 ADJUST AND CLEAN

A. Clean exposed surfaces of acoustical ceilings, including trim, exposed grid and edge mouldings. Comply with manufacturer's instructions for cleaning and touch-up of minor finish damage.

B. Remove and replace work which cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION

SECTION 09630

INTERIOR STONEWORK

PART 1 - GENERAL

1.01 SUMMARY

A. Work of this Section is governed by General Conditions of the Contract and by provisions contained in Division 0 and Division 1 of these Specifications.

B. Work Included: This Section generally includes the following:

1. Stone floor panels.
2. Stone countertops.
3. Stone saddles.
4. Stone wainscot.
5. Setting beds and grout material.
6. Setting bed slip sheet.
7. Metal anchors, shims or fasteners.
8. Wood substrates, metal framing supports as indicated and as required for a complete installation.
9. Impregnator/sealer on stonework.
10. Provide protection of stone to ensure pristine condition of stone before, during and upon completion.
11. Mock-ups of stone panels is required at location determined by the Architect.
12. Leveling of existing concrete slab with fast-setting, self-leveling, underlayment compound is provided under Section 03320 "Lightweight Fill and Flash Patching."
13. Crack isolation treatment of individual cracks and installation of crack suppressant membrane system over entire, cured, leveled, setting bed.

14. Control joints in accordance with referenced standards i.e., Marble Institute of America and Tile Council of America; in locations established on final shop drawings. Coordinate with Section 07900 "Joint Sealants".

C. Related Work:

1. Lightweight fill, flash patching and leveling compound - Section 03320.

2. Rough carpentry - Section 06100.

3. Architectural woodwork - Section 06400.

4. Joint sealants - Section 07900.

5. Gypsum board systems - Section 09250.

D. Work Not In Contract (NIC):

1. Resilient flooring and base covering - Section 09650.

2. Carpeting - Section 09680.

1.02 REFERENCE STANDARDS

A. American National Standards Institute (ANSI)

B. Marble Institute of America (MIA)

C. Tile Council of America (TCA)

D. American Standards for Testing and Materials
ASTM C-880 Modified Test Method for Flexural Strength of Dimensional Stone with Anchor Assemblies as Support Blocks

1.03 SUBMITTALS

A. Product Data: Submit a minimum of 3 copies of manufacturer's technical information and installation instructions for materials required, except bulk materials.

B. Shop Drawings:

1. Submit shop drawings and fabrication details showing cutting and setting for Architect's approval before setting.

2. Shop drawings shall indicate size, thickness, material, quantity, finish, attachment method and anchorage type, epoxied quirk miters, direction of veining [if any], and other data as may be required. Indicate mechanical *stud and bolt attachment of countertop to stainless steel framing. Indicate* fire retardant/waterproof plywood substrate and adhesive and/or mechanical method of attachment of stone thereto.

3. Shop drawings showing stone panel layout and indicating starting point for each area to receive stone panel.

C. Samples: Submit sample of each type of stone. Submit actual sample of marble tile and panels; showing pattern [if any], color, edge treatment; including finished edge of cut stone Submit range of inherent veining, shading, and coloration which can be expected for review.

1. Submit all stone samples coated with sealer/impregnator for review by *Architect to ensure match with Architect's control samples.*

2. Submit samples of custom tinted grout to match stonework.

D. Submit stone testing for each stone type. Submit substantiation of Marble Institute of America's "A" rating of stone.

E. Submit certification stating that stone type and size including thickness is suitable type of stone and method of installation.

F. Guarantee: Submit manufacturer/fabricator/installer's joint guarantee for a period of five years from date of substantial completion. Submit Laticrete special 5 year warranty for materials and installation.

1.04 QUALITY ASSURANCE

A. Fabricator/Installer Qualifications: Firm with a minimum of 5 years experience in the fabrication/installation of materials specified, on comparable projects and having approval of materials manufacturer.

B. Provide materials obtained from one source for each type and color of stone grout and setting materials.

C. All exposed surfaces shall be finished.

D. The Architect reserves the right to:

1. Review the full layout of all slab, panel and tile prior to installation--set out in stone yard;

2. Review the full extent of marble slab, panel, and tile to ensure match with Architect's control samples.

3. Reject any and all stone slabs, tile, and panels not deemed acceptable with specific regard to consistent figuring of the stone for the Project and for specific areas; and acceptable transition of such figuring from stone slab to panel as well as figuring within the panel.

E. Verify all dimensions in the field prior to fabrication of stonework to assure proper fit and alignments. Before proceeding with stonework required to be fitted to other construction, obtain measurements and verify dimensions of shop drawings details to ensure accurate fit.

F. Verify substrate conditions and establish procedures to ensure suitability of stone types and sizes including thicknesses of stone types for required installation.

1.05 DELIVERY, STORAGE AND HANDLING

A. Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use. Prevent damage or contamination to materials by water, freezing, foreign matter or other causes.

B. Protect stone during delivery, storage and handling against moisture, soiling, staining, chipping, cracking, fracturing, breakage, and other damage.

C. Proprietary Materials: Handle, store, mix and apply proprietary setting and grouting materials in compliance with manufacturer's instructions.

1.06 PROJECT CONDITIONS

A. Maintain environmental conditions and protect work during and after installation to comply with referenced standards and manufacturer's printed recommendations.

B. Maintain temperatures at not less than 50 deg. F during installation and for 7 days after completion, unless higher temperatures required by referenced installation standard or manufacturer's instructions.

C. Protect adjacent surfaces from damage. Protect exposed surfaces of stone units from damage or defacement. Prevent materials used for installing work of this Section from staining or damaging the exposed surfaces of stone units or the exposed surfaces of the adjoining construction.

PART 2 - PRODUCTS

2.01 MATERIAL

A. Provide stone types as indicated on Drawings and schedules.

2.02 METAL ANCHORS AND SUPPORT

A. Anchors, clips, fasteners, metal framing [if any] shall be fabricated from AISI Type 304 Stainless steel. Coordinate and comply with the applicable material requirements of Section 05500 "Miscellaneous Metal".

2.03 SETTING MATERIALS

A. Portland cement: ASTM C150 Type 1.

B. Sand: ASTM C144

C. Latex-Portland Cement Mortar: Comply with ANSI A118.8; "259 Rapid-Flex" Thin-set mortar (White) gauged with "3701 Mortar Admix" by Laticrete International, Inc.; with latex content as recommended by the manufacturer.

D. Crack suppressant membrane: "Anti-Fracture Membrane 9235" by Laticrete International, Inc.; two part system.

E. Water: Clear and without deleterious substances which would impair the work.

F. Organic adhesive: Comply with ANSI A136.1; type as recommended by stone fabricator/installer.

G. Separator sheet/isolation membrane: Comply with type as recommended by stone fabricator/installer.

H. Wire Mesh: Galvanized; 2" x 2" 16/16 gauge.

2.04 GROUTING MATERIALS

A. Grout: Latex Portland cement grout, proprietary compound of Portland cement with latex additive to ensure flexibility and less permeability; color to match stone. Custom color [factory formulated], joint size and type as selected by Architect. "600 Series" unsanded grout with "1776 Grout Admix" as manufactured by Laticrete International, Inc.

2.05 SEALER

A. Sealer: Stoneguard Penetrating Sealer and accessories as manufactured by Stone Care International Products, Owings Mills MD (410 363-8788).

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine the substrates, adjoining construction and the conditions under which interior stonework is to be installed. Do not proceed with the Work until unsatisfactory conditions have been corrected.

B. Allowable Variations in Substrate Levels: Same as allowable variation in finished work.

3.02 PREPARATION

A. Remove substances that would interfere with proper bond of adhesive or mortar joint.

B. Clean all other substrates as required to remove deleterious substances that might impair the work.

C. Coordinate with Section 03320 "Lightweight fill, flash patching and leveling compound" whose work includes preparation of slab as required.

D. Install crack suppression membrane system over cured leveling underlayment in accordance with manufacturer's recommendations.

3.03 PLACEMENT METHODS

A. Install stonework and accessories using the indicated setting methods for stonework in accordance with the recommendations of the fabricator and the final shop drawings.

B. Lay out stone panel work in patterns shown. Unless otherwise shown on the drawings, center stone panel fields both directions in each space or on each wall area and adjust to minimize stone panel cutting. Use uniform joint widths *of* 1/16".

3.05 INSTALLATION

A. Align grout lines in stone floor panels with grout lines in base.

B. In areas designated on shop drawings, place dry panels in patterns indicated, and schedule a meeting with the Architect for timely inspection, and adjustment if required, before panel installation.

C. Back butter each stone with mortar specified and beat into fresh mortar. Install in accordance with referenced standards. Ensure full mortar coverage of each stone. Provide 95% mortar coverage on each stone including full support of edges and corners.

D. Grouting: Grout stonework to comply with referenced installation standards, using grout materials indicated.

E. Install stone tops on plywood using clips and organic adhesive. Where joints occur on horizontal surfaces, provide joints acceptable to the Architect.

F. Install wall panels in accordance with recommendations of Marble Institute of America.

G. Allowable Variations in Finished Work: Do not exceed the following deviations from level and plumb, and from elevations, locations, slopes and alignments shown:

1. Floors: 1/8" in a 10' run, any direction; ±1/8" at any location; 1/32" offset at any location.

2. Joints: ±1/32" joint width variation at any location; 1/16" in a 3' run for deviation from plumb and true, and for other variations in alignment of joints.

3. Walls: ±1/32" joint width variation at any location; 1/16" in a 3' run for deviation from plumb and true, and for other variations in alignment of joints.

4 Lippage is unacceptable.

3.06 SEALER

A. Apply system as specified hereinbefore in accordance with manufacturer's recommendations. Apply in thin coats. Do not allow excess sealer to dry on surface. Darkening or other changes in stone appearance are unacceptable.

3.07 CLEANING AND PROTECTION

A. Upon completion of placement and grouting, clean all stone surfaces free of foreign matter.

B. When recommended by panel manufacturer, apply a protective coat of neutral protective cleaner to completed panel walls and floors. Protect installed panel

work with Kraft paper or other heavy covering during construction period to prevent damage and wear.

C. Prohibit foot and wheel traffic from using floors for at least 3 days after grouting is completed.

D. Before final inspection, remove protective coverings and rinse neutral cleaner from panel surfaces.

END OF SECTION

SECTION 09900

PAINTING AND FINISHING

PART 1 - GENERAL

1.01 SUMMARY

A. Work of this Section is governed by General Conditions of the Contract and by provisions contained in Division 0 and Division 1 of these Specifications.

B. Work Included: This Section generally includes the following:

1. Prime and finish painting, including touching up of and repairing of abraded, damaged or rusted prime coats.

2. Painting gypsum board, wood, and ferrous metal including preparation and priming.

3. Painting pipes, coverings, conduit, ducts, insulation, hangers, supports and primed metal surfaces of other mechanical and electrical items and equipment exposed to view, unless otherwise indicated.

4. Painting concealed surfaces which are exposed-to-view, such as above, behind or below grilles, gratings, diffusers, louvers and lighting fixtures.

5. Painting of any surface not specifically mentioned to be painted herein or on drawings, but for which painting is obviously necessary to complete the work.

6. Incidental painting and touching up as required to produce proper finish for all painted surfaces, including touching up of factory finished items where permitted by Architect.

7. Stripping, cleaning, priming and painting elevator frames.

8. The Contractor is referred to and requested to read the specifications pertaining to the work and materials of the related trades to become familiar with the extent of various materials used and the provisions regarding their painting and/or finishing. Surfaces left unfinished by the requirements of other specifications shall be painted or finished as part of the Work. A complete job is required whether or not every item is specified herein. Work requiring finishes and not specified shall be finished in accordance with the requirements for adjacent work.

C. Related Work

1. Selective demolition and alterations work - Section 02050.

2. Miscellaneous metal - Section 05500.

3. Architectural woodwork - Section 06400.

4. Hollow metal doors and frames - Section 08110.

5. Wood doors - Section 08200.

6. Gypsum board systems - Section 09250.

7. Artisan wall finish - Section 09920.

9. Mechanical items - Division 15.

10. Electrical items - Division 16.

11. Shop priming of related trades: Unless otherwise specified, shop priming of ferrous metal items is included under the respective trade sections for miscellaneous metal fabrications, factory fabricated components such as wood casework and special equipment, and shop fabricated or factory built mechanical and electrical equipment or accessories. Refer to Structural Drawings for shop priming of structural steel.

1.02 MATERIALS AND EQUIPMENT NOT TO BE PAINTED

A. Surfaces not to be painted shall be left completely free of drippings and accidentally applied materials. Unless otherwise indicated, the following shall not be painted:

1. Non-ferrous and ornamental metals.

2. Concealed surfaces not exposed to view.

3. Finish hardware.

4. Items furnished with factory finish.

5. Moving mechanical equipment parts.

6. Code-required labels.

7. Operating parts and labels.

1.03 SUBMITTALS

A. Product data: Submit copies of manufacturer's latest published literature for materials specified herein. Product data shall include the following:

1. Name and title of material.

2. A schedule listing of the proposed manufacturer's number, title of material, date of manufacturer, with reference to the specification article number and specified product.

3. Contents by volume, for major pigment and vehicle constituents.

4. Thinning instructions.

5. Application instructions.

6. Material safety data sheets [MSDS] for all materials and products used as part of the Work of this Section.

B. Materials List: Prior to delivery, submit to the Architect a complete list of all materials and applications. This shall in no way be construed as permitting substitution of materials for those specified or accepted for this work by the Architect.

1. Include certificates attesting to compliance with specifications, verifying compatibility of finish and intermediate coats with. prime coats applied under this or other sections, and verifying compatibility of coatings with the substrates to which they will be applied.

C. Painting Schedule: Within 15 days after award of contract submit to the Architect a detailed schedule based on surfaces to be painted, showing types and brand names of materials and number of coats to be applied.

D. Samples: Prior to beginning work, submit samples to match Architect's control samples. Samples shall be reviewed for review of color, sheen and texture. Provide a listing of materials and application for each coat of each finish sample.

1. Submit the following (3) 8-1/2" x 11" identically finished samples of each color and material, with texture, to simulate actual conditions. These will be reviewed by the Architect under lighting of the type to be used on the project for color, texture and workmanship. Resubmit samples as requested.

a. Provide 3 samples of each paint color and finish on same substrate to which the paint will be applied i.e. wood, drywall.

b. Provide 3 samples of each paint color and finish on each type of wood specified to receive painted finish, including door, base and trim.

1.03 QUALITY ASSURANCE

A. Qualification of Painters: Use only qualified journeyman painters for the mixing and application of paint on exposed surfaces.

B. Code Compliance: All paint and coating products must comply with V.O.C./V.O.S. requirements of authorities having jurisdiction.

C. Color Quantity Control: To ensure color match, coordination is required between the related trade's work with matching paint color.

D. Paint Coordination

1. Provide finish coats which are compatible with the prime paints used. Review other Sections of these specifications in which prime paints are to be provided, to ensure compatibility of the total coatings system for the various substrates.

2. Notify the Architect in writing of any anticipated problems using the coating systems as specified with substrates primed by others.

1.05 PRODUCT HANDLING

A. Order materials sufficiently in advance and in adequate quantities to avoid delays at the project. Paints shall be ready-mixed, unless otherwise directed by the Architect.

B. Deliver materials to job site in original, new and unopened packages and containers bearing manufacturer's name and label, following information:

1. Name or title of material.

2. Manufacturer's stock number and date of manufacture.

3. Manufacturer's name.

4. Contents by volume, for major pigment and vehicle constituents.

5. Thinning instruction.

6. Application instructions.

7. Color name and number.

C. Storage and Protection

1. Store only approved materials at the job site, in an area used solely for the storage of paint materials and related equipment. Use a dry, well-ventilated space with a temperature range between 60 and 80 degrees F. Store materials not in use in tightly covered containers, maintained in clean condition, free of foreign material and residue.

2. Protect paint materials before, during and after application, and ensure the prompt and safe disposal of related waste products.

3. Protect finished work, and materials of other trades, and in the event of damage, immediately make all repairs and replacements.

1.06 JOB CONDITIONS

A. Examine areas to receive painting, and notify the Contractor of any conditions observed that would be detrimental to the quality of completed work.

B. Apply paints only to surfaces that are clean, dry and free from frost, in an atmosphere that is free from dust and airborne material that might become embedded on freshly painted surfaces.

C. Do not apply paint when temperature is below 50°F or relative humidity exceeds 85% unless specifically permitted by the manufacturer and approved by the Architect.

D. Commence painting only after lighting fixtures have been installed and are in use, or after temporary lighting providing 50 average foot candles has been provided.

E. Equipment: Provide scaffolding, ladders and other equipment necessary for the proper execution of the work of this section, all conforming to applicable laws, rules and regulations.

F. Protection: Provide and maintain warning signs and coverings and other protection to prevent damage to work of this section and to the work of others.

1.08 ATTIC STOCK

A. Provide Owner with the following minimum quantities of attic stock paint, comprised of unopened containers remaining from painting work performed and

additional containers as required to meet minimum quantities indicated. Provide containers bearing manufacturer's labels and paint color and identified by the codes used on finish drawings:

1. Two 1-gallon cans of each paint designation noted on the Finish Schedule.

B. Obtain from the Owner, receipt for these materials, and forward a copy to the Architect.

PART 2 - PRODUCTS

2.01 MATERIALS, GENERAL

A. Provide best quality and grade painting products listed in the Painting Schedule at the end of this Section, unless otherwise noted. Comply with specified number of coats and required minimum mil thicknesses.

1. Paint shall not be badly settled, caked or thickened in the container, shall be readily dispersed with a paddle to a smooth consistency and shall have excellent application properties.

B. Paint shall arrive to the job site in factory labeled unopened containers, color-mixed except for tinting of under-coats and possible thinning.

C. Provide prime paint produced by the same manufacturer as the finish coats. Use only thinners approved by the paint manufacturer, and use only to recommended limits.

D. Paint colors, surface treatment and sheens are indicated on the contract drawings. Certain colors may require paint manufacturer to prepare special factory mixes to match colors selected by the Architect.

E. Surfaces shall be painted as specified. However, the Architect reserves the right to change the finishes within the range of flat, eggshell, satin-gloss or gloss, without additional cost to the Owner.

F. Mixed colors shall match the color selection made by the Architect, prior to application of the coating.

G. For alkyd paints, provide certification from manufacturer that selected colors will be available for at least 5 years from time of application.

1. Certification shall state that the colors will not differ due to changes in their chemical composition, particularly resultant from quantities and types of solvents used.

2.02 ACCEPTABLE MANUFACTURERS

A. Schedule: Refer to Drawings.

B. Unless otherwise noted, specified products are manufactured by Benjamin Moore & Co. Provide products specified or equivalent products manufactured by the following:

1. Con Lux Coatings.

2. PPG Industries.

3. Sherwin Williams.

C. Pigments: Pure, non-fading, of types to suit paints, substrates and service indicated.

D. Linseed Oil: Raw or boiled, as required, of approved manufacture, per ASTM D234 and D260, respectively.

E. Turpentine: Pure distilled gum spirits of turpentine, per ASTM D13.

F. Driers, Putty, Spackling Compound, Patching Plaster, etc.: Best quality, of approved manufacturer.

G. Heat Resistant Paint: Where required, use heat resistant paint when applying paint to heating lines and equipment.

H. Galvanizing Cleaner: Porter Prep No. 99, applied per manufacturer's instructions.

I. Galvanizing Primer: Porter No. 299 Alkyd Zinc Dust Primer applied per manufacturer's instructions.

2.03 PIPING AND MECHANICAL EQUIPMENT

A. Paint exposed piping, conduits, ductwork, mechanical and electrical equipment. Use heat resisting paint when applied to heating lines and equipment.

B. Exposed Uncovered Ductwork, Piping, Hangers and Equipment: Alkyd Enamel Undercoat and 1 coat Alkyd Flat.

C. Exposed Covered Piping, Ductwork and Equipment: Primer/Sealer and 1 coat Alkyd Flat.

D. Panel Boards, Grilles and Exposed Surfaces of Electrical Equipment: Alkyd Enamel Undercoat and 2 coats Alkyd Semi-Gloss.

E. Conduit and distribution boxes, light and power panels, hangers, clamps, etc., are included where painting is indicated.

F. Coordinate Mechanical and Electrical items which are furnished painted with the work of this Section.

PART 3 - EXECUTION

3.01 INSPECTION

A. Examine the areas and conditions where the painting is to be performed and notify the Architect of conditions detrimental to the completion of the work.

B. Do not proceed with the work until unsatisfactory conditions have been corrected.

3.02 PREPARATION

A. Clean surfaces to be painted before applying paint or treatments. Remove oil and grease with clean cloths and cleaning solvents prior to mechanical cleaning. Mildew shall be removed and neutralized.

B. Program the cleaning and painting so that dust and other contaminants from the cleaning process will not fall in wet, newly painted surfaces.

C. Mix and prepare painting materials in strict accordance with the manufacturer's directions to produce a mixture of uniform density. Remove film, and strain if necessary.

D. Protect adjacent work and materials by covering, masking or other method

E. Remove and protect hardware, accessories, plates, lighting fixtures, factory finished work, and similar items, or provide in place protection. Upon completion of each space, carefully replace all removed items.

F. Remove electrical panel box covers and doors before painting walls. Paint separately and re-install after all paint is dry.

G. Metal Surfaces: Fill dents, cracks, hollow places, open joints and other irregularities in metal work to be painted with approved metal filler and sand to a smooth, hard finish, flush with adjoining surface.

1. Weld Fluxes: Remove weld fluxes, splatters, and alkali contaminants from metal surfaces in an approved manner and leave surface ready to receive painting.

2. Bare Metal: Thoroughly clean off all foreign matter such as grease, rust, scale and dirt before priming coat is applied. Clean surfaces by flushing with mineral spirits.

3. Shop Primed Metal: Clean off foreign matter as specified for "Bare Metal". Prime bare, rusted, abraded and marred surfaces with approved primer after proper cleaning of surfaces. Sandpaper all rough surfaces smooth.

4. Galvanized Metal: Wipe down surface as per SSPC Spec. SP-1. Clean with galvanize cleaner, then wash with clear water.

H. Gypsum Board Surfaces: Scrape off all projections and splatters, spackle all holes or depressions, including taped and spackled joints, sand smooth. Conform to standards of approved Job Mock-Up.

I. Wood Surfaces: Clean, sand, touch-up prime coat, to conform to standards of approved Job Mock-Up.

3.03 APPLICATION

A. Application may be by brush or roller, or by electrostatic spray where scheduled.

B. Apply paint by brush or roller in accordance with the manufacturer's directions. Use brushes best suited for the type of material being applied. Use rollers of carpet, velvet back, or high pile sheep's wool as recommended by the paint manufacturer for material and texture required.

C. All materials shall be applied under adequate illumination, evenly spread and flowed on smoothly to avoid runs, sags, holidays, brush marks, air bubbles and excessive roller stipple.

D. Coverage and hide shall be complete. When color, stain, dirt or undercoats show through final coat of paint, the surface shall be covered by additional coats until the paint film is of uniform finish, color, appearance and coverage, at no additional cost to the Owner.

E. All walls indicated to receive fabric or vinyl application shall be primed and prepared with complete coverage and hide prior to fabric or vinyl installation.

F. Tint each undercoat a lighter shade where multiple coats are applied. All coats shall be dry to manufacturer's recommendations before applying succeeding coats.

G. All suction spots or "hot spots" after the application of the first coat, shall be touched up before applying subsequent coats.

H. Take care to ensure that all surfaces, including edges, corners, crevices, welds, and exposed fasteners receive a film thickness equivalent to that of flat surfaces.

I. Paint surfaces behind movable equipment and furniture the same as similar exposed surfaces.

J. Match colors and textures to approved samples and Job Mock-Up, and remove finish and repaint surfaces that do not comply.

K. Paint interior surfaces of ducts, where visible through registers or grilles, with a flat, non-specular black paint, before final installation of equipment.

L. "Touching-Up" of Factory Finishes: Unless otherwise indicated, materials with a factory finish shall not be painted at the project site. To "touch-up", use the factory finished material manufacturer's recommended paint materials to repair abraded, chipped, or otherwise defective surfaces.

M. Paint Thickness: Follow the specified minimum dry film (MDF) thickness requirements in the application of 2 coat and 3 coat work; the MDF for each coat shall not be less than 1.5 mils., or as recommended in paint manufacturer's printed specifications:

1. 3 coat work shall not be less than 5.0 mils total.

2. 2 coat work shall not be less than 3.0 mils total.

3.04 CLEAN UP

A. During the progress of the work, remove from the site all discarded paint materials, rubbish, cans and rags at the end of each work day.

B. Upon completion of painting work, clean glass and other paint spattered surfaces. Remove spattered paint by proper methods of washing and scraping, using care not to scratch or damage finished surfaces.

C. At the completion of work of other trades, touch-up and restore all damaged or defaced painted surfaces.

3.05 PROTECTION

A. Protect work of other trades, whether to be painted or not, against damage by the painting and finishing work. Leave all such work undamaged. Correct any

damages by cleaning, repairing or replacing, and repainting, as acceptable to the Architect.

B. Provide "Wet Paint" signs as required to protect newly painted finishes. Remove temporary protective wrappings provided by others for protection of their work after completion of painting operations.

3.06 PAINT SYSTEMS

A. Gypsum Board Systems

1. Ceilings/Soffits/Fascia/Flat Latex Finish (unless otherwise indicated)

a. Prime Coat: Latex Quick Dry Prime Seal (201)

b. Second and Third Coats: Regal Wall Satin (215)

2. Walls/Eggshell Latex (unless otherwise indicated)

a. Prime Coat: Latex Quick Dry Prime Seal (201)

b. Second and Third Coats: Regal Aquavelvet (319)

B. Ferrous Metal (Spray Application where noted)

1. Satin Gloss Alkyd Enamel Finish

a. Prime Coat: Iron Clad Retardo Rust Inhibitive Paint (163)

b. Second and Third Coats: Alkyd Dulamel (207)

C. Wood - (shop finished)

1. Refer to Section 06400 "Architectural Woodwork".

D. Wood - (field applied)

1. Satin Gloss Alkyd Enamel Finish

a. Prime Coat: Moore's Alkyd Enamel Underbody (217)

b. Second and Third Coats: Alkyd Dulamel (207)

END OF SECTION

SECTION 09920

ARTISAN WALL FINISH

PART 1 - GENERAL

1.01 SUMMARY

A. Work of this Section is governed by General Conditions of the Contract and by provisions contained in Division 0 and Division 1 of these Specifications.

B. Work Included: This Section generally includes the following:

1. Provide preparation and finishing mock-ups at designated locations to establish accepted preparation and visual appearance of the Artisan Wall Finish which forms the work of this Contract.

2. Incidental work relating to Artisan Wall Finish and touching up as required to produce proper finish where permitted by Architect.

C. Related Work

1. Gypsum board systems - Section 09250.

2. Fabric wrapped panels - Section 09985.

3. Gypsum board systems - Section 09250.

1.03 SUBMITTALS

A. Submit copies of current published literature for materials which comprise the Artisan Wall Finish.

B. Preparation Schedule: Within 15 days after award of contract submit to the Architect a detailed schedule based on surfaces to be prepared and locations where the work is to be performed.

D. Samples: Prior to beginning work, submit samples for Architect's review and acceptance as control samples. Samples shall be reviewed for review of color, sheen and texture.

1.03 QUALITY ASSURANCE

A. Job Walk-Through: During bidding period, there will be a walk-through by the Architect, Construction Manager and Artisan and contractor of respective trade substrate(s) to establish the extent and degree of preparation of substrates required to complete the work of this Contract.

B. Coordination:

1. Notify the Architect in writing of any anticipated problems in the furnishing and installing of the Artisan Wall Finish.

3. Notify the Architect in writing of any anticipated problems regarding preparation of surfaces.

E. *Mockups: Provide mockup of Artisan Wall Finish over actual substrate designated* to receive finish for review and acceptance of the Architect at a location to be determined by Architect. Mock-up shall show preparation, priming, and materials, finish, color and method of application; and accepted mock-ups will be used as standards for the Artisan Wall Finish on the Project.

1.05 PRODUCT HANDLING

A. Order materials sufficiently in advance and in adequate quantities to avoid delays at the project.

B. Deliver materials to job site in original, new and unopened packages and containers bearing manufacturer's name and label.

C. Storage and Protection

1. Protect materials before, during and after application, and ensure the prompt and safe disposal of related waste products.

2. Protect finished work, and materials of other trades, and in the event of damage, immediately make all repairs and replacements.

1.06 JOB CONDITIONS

A. Examine areas to receive artisan wall finish, and notify the Contractor of any conditions observed that would be detrimental to the quality of completed work.

B. Commence artisan wall finish only after lighting fixtures have been installed and are in use, or after temporary lighting providing 50 average foot candles has been provided.

F. Equipment: Provide scaffolding, ladders and other equipment necessary for the proper execution of the work of this section, all conforming to applicable laws, rules and regulations.

PART 2 - PRODUCTS

2.01 MATERIALS, GENERAL

A. As selected by the Artisan and acceptable to the Architect.

PART 3 - EXECUTION

3.01 INSPECTION

A. Examine the areas and conditions where the painting is to be performed and notify the Architect of conditions detrimental to the completion of the work.

B. Do not proceed with the work until unsatisfactory conditions have been corrected.

3.02 PREPARATION

A. Clean surfaces to receive Artisan Wall Finish.

B. Program the cleaning and Artisan Wall Finish Work so that dust and other contaminants from the cleaning process will not fall in wet, newly finished surfaces.

C. Mix and prepare materials to produce a mixture of uniform density.

D. Protect adjacent work and materials by covering, masking or other method.

E. Remove and protect hardware, accessories, plates, lighting fixtures, factory finished work, and similar items, or provide in place protection. Upon completion of each space, carefully replace all removed items.

F. Gypsum Board Surfaces: Scrape off all projections and splatters, spackle all holes or depressions, including taped and spackled joints, sand smooth. Conform to standards of approved Job Mock-Up.

3.03 APPLICATION

A. All materials shall be applied under adequate illumination, evenly spread and flowed on smoothly to avoid runs, sags, holidays, brush marks, air bubbles and excessive roller stipple.

B. When color, stain, dirt or undercoats show through Artisan Wall Finish, the surface shall be refinished so finish, color, appearance matches mock-up.

J. Match colors and textures to approved samples and Job Mock-Up, and remove finish and refinish surfaces that do not comply.

3.04 CLEAN UP

A. During the progress of the work, remove from the site all discarded materials, rubbish, cans and rags at the end of each work day.

B. Upon completion of painting work, clean glass and other spattered surfaces. Remove spattered material by proper methods of washing and scraping, using care not to scratch or damage finished surfaces.

C. At the completion of work of other trades, touch-up and restore all damaged or defaced painted surfaces.

3.05 PROTECTION

A. Protect work of other trades, whether to be finished or not, against damage caused by the work of this contract. Leave all such work undamaged. Correct any damages by cleaning, repairing or replacing, and repainting, as acceptable to the Architect.

END OF SECTION

SECTION 10160

METAL TOILET PARTITIONS

PART 1 - GENERAL

1.01 SUMMARY

A. Work of this Section is governed by General Conditions of the Contract and by provisions contained in Division 0 and Division 1 of these Specifications.

B. Work Included: This Section generally includes the following:

1. Metal toilet partitions, floor to ceiling braced, as shown and as scheduled.

2. Stainless steel hardware and miscellaneous accessories.

3. Miscellaneous steel support/bracing of partitions as required.

4. Adjustment, cleaning and protection of accessories.

C. Related Work

1. Miscellaneous metal - Section 05500.

2. Rough Carpentry [Wood Blocking] - Section 06100.

3. Gypsum board partitions and reinforcement - Section 09250.

4. Tile - Section 09300.

5. Toilet Accessories - Section 10800.

1.02 QUALITY ASSURANCE

A. Field measurements: Take field measurements prior to fabrication to ensure proper fitting of the work.

B. Inserts and Anchorages: Furnish inserts and anchoring devices which must be set in other work and coordinate their delivery to avoid delay.

C. Manufacturer's name or identifying markings are not permitted on exposed surfaces of any partition, including hardware.

D. Inserts and Anchorages: Furnish inserts and anchoring devices which must be set in other work and coordinate their delivery to avoid delay.

E. Comply with handicap code requirements of the authorities having jurisdiction with regard to compartment size, accessory requirements and locations.

1.03 SUBMITTALS

A. Shop Drawings: Submit room layouts and elevations with dimensions based on actual dimensions taken at site. Shop drawings shall include materials, finishes, details of construction including overhead miscellaneous steel support, gauges of metal, hardware, fastening and anchoring conditions and relation to adjoining construction.

B. Samples: Submit (3) 6" X 6" samples of baked enamel finish on steel; in selected custom color to match Architect's sample. Submit hardware and fitting items and fastenings for same.

C. Templates: Submit templates to other trades as required for coordination.

D. Warranty: Submit copy of manufacturer's warranty for a period of one year after substantial completion.

1.04 DELIVERY, STORAGE AND HANDLING

A. Deliver accessories to the site, ready for use, in the manufacturer's original and unopened containers and packaging, bearing labels as to type or material, manufacturer's name and brand name.

B. Store and handle accessories in accordance with manufacturer's instructions.

C. Remove materials which are disfigured, scratched or not suitable and replace with new materials.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Ampco Products Inc.

B. Flush-Metal Partition Corp.

C. Global Steel Products Corp.

D. Sanymetal Products Co.

2.02 FABRICATION

A. Doors: 1" thick, 2 sheets, 22 gauge on inorganic sound-deadening core, locking strip trim welded on, mitered at corners. Custom color to match Architect's color sample.

B. Partitions: similar to doors, 20 gauge minimum. Custom color to match Architect's sample.

C. Pilasters: similar to doors, 16 gauge minimum, 1-1/4" thick.

D. Trim: Polished stainless steel shoe, concealed fastenings.

E. Stainless steel hardware: surface mounted slide latches, combination stop and keeper, brackets, coat hook/bumper, hinges shall be standard to the manufacturer.

2.03 FABRICATION

A. Cut out and reinforce for stall-mounted accessories, and install in shop.

2.04 FINISH

A. Finish: Metal, powder coated baked enamel in custom color to match Architect's control sample; electrostatically applied.

PART 3 - EXECUTION

3.01 PREPARATION

A. Accessories shall be closely coordinated with work other trades, so that the necessary reinforcing is provided to receive the accessories.

B. Furnish templates and setting drawings and anchor plates required for the proper installation of the accessories at gypsum board.

C. Coordinate the work to ensure that base plates and anchoring frames are in the proper position to secure the accessories.

3.02 INSTALLATION

A. Install in accordance with manufacturer's instructions, in a rigid and permanent manner, straight and plumb, with all horizontal lines level.

B. Attach brackets to reinforcing plates in wall, and hang pilasters from channels above ceiling, as recommended by manufacturer. Fit doors and hardware. Check for uniform clearances not exceeding 3/16".

3.03 ADJUSTING AND CLEANING

A. Adjust toilet partitions for proper operation and verify that hinges and latches function smoothly. Replace damaged or defective items. Clean exposed surfaces.

B. Restore or replace installed work which is damaged or defective to the Architect's satisfaction, at no additional cost to the Owner.

END OF SECTION

SECTION 10270

ACCESS FLOORING

PART 1 - GENERAL

1.01 SUMMARY

A. Work of this Section is governed by General Conditions of the Contract and by provisions contained in Division 0 and Division 1 of these Specifications.

B. Work Included: This Section generally includes the following:

1. Access flooring and understructure generally consisting of nominal 24" square, removable, all aluminum modular panels supported on heavy duty snap-on steel stringer understructure; where indicated on Drawings and Schedules.

2. Aluminum sheet vertical fascia.

3. Grommets and trimmed cut-outs.

4. Plastic trim.

5. High pressure laminate tile finish.

6. Fixed and removable handrails and guardrails—satin finished chrome plated brass.

7. Ramp; non-slip rubber floor tile at ramp; as indicated on drawings.

8. Perforated panels with dampers.

9. Panel lifters.

10. Re-level access flooring after accommodation of work of related trades.

C. Related Work

1. Lightweight fill, flash patching and leveling compound [sealing of concrete substrate under access flooring] - Section 03320.

3. Mechanical/Electrical underfloor services - Divisions 15 & 16.

1.03 SUBMITTALS

A. Product Data: Submit manufacturer's technical data, maintenance and installation instructions for access flooring.

B. Samples: Submit full size samples of high pressure laminate floor finish panel and pedestal.

C. Shop Drawings: Submit layout of access flooring based on verified field dimensions; with details of assembly components, method of anchoring, perimeter and edge conditions, grounding and related requirements. Include dimensions to adjoining work, notes describing materials, finishes, fasteners, accessories and understructure; details at cut panels, dividing partition work, and related special conditions.

D. Certification and Test Data: Submit manufacturer's certification, including laboratory test data showing that access flooring complies with indicated performance requirements. Submit certification that plastics used in access flooring components and accessories are fire retardant.

E. Submit structural calculations for rolling load capacities of ramps.

1.04 QUALITY ASSURANCE

A. Installer Qualifications: Firm having successfully completed similar installations, approved by access flooring manufacturer.

B. National Fire Protection Association (NFPA) Standards:

1. Provide access floor assembly complying with National Fire Protection Association (NFPA) #75 for raised flooring.

2. System conductivity shall be tested in accordance with NFPA #99, Chapter 3, modified when maintaining the room at 45% +/-5% relative humidity.

C. Structural Performance Requirements:

1. Concentrated load performance: Panels shall be capable of supporting a concentrated load of 1000 lbs. placed on a one square inch area at any location on the panel with a maximum top surface permanent set not to exceed 0.010 inches after load is removed.

2. Uniform load performance: Panels shall be capable of supporting a uniform load of 300 lbs. placed on a one square foot area.

3. Ultimate load performance: The ultimate strength of the floor system shall provide a loading capacity of 2500 lbs. without failure. Failure is defined as the point at which the panel will no longer accept the load.

4. Rolling load: 1000 lbs. per 10 passes; 1000 lbs. per 10,000 passes. with local and overall surface deformation not to exceed 0.040 inches.

5. Impact load performance: Panels and supporting understructure shall withstand without failure an impact load anywhere on the panel of 150 lbs. dropped from a height of 36 inches onto a one square inch area. Failure is defined as the point at which the panel will no longer accept the load.

6. Floor system shall be capable of supporting a fully loaded paper pallet.

7. Handrails and Toprails: Capable of withstanding a lateral force of 40 lbs. per linear foot and a vertical load of 50 lbs. per linear foot applied simultaneously. Install to withstand at least 200 lbs. pressure applied from any direction.

8. Electrical Resistance: Panel-to-understructure, metal-to-metal contacts shall have no more than 10 ohms resistance, without the use of continuity clips.

D. Pre-Installation Conference: Prior to installation of access flooring, meet at project site with Architect, access flooring Installer, manufacturer's representative and other parties concerned with access flooring installation and performance. Provide at least 72 hours advance notice of conference to participants.

1.04 ATTIC STOCK

A. Provide attic stock in the amount of 5% for panels with cutouts (each type).

B. Provide attic stock in the amount of 5% for panels with grommets.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Provide Heavy Duty Snap-On Stringer System for Aluminum Access Floor Panel as manufactured by Tate Access Flooring or approved equal.

2.02 PANELS AND ACCESSORIES

A. Provide access floor system in accordance with the following:

1. Floor Panel: Shall consist of die cast aluminum construction, 24"panel sheet and a painted finish.

2. Perforated Panel: Provide perforated panels with open area as required by project requirements Coordinate with Division 15 Specifications series.

3. Pedestal assembly: Shall provide an 5000 lb. load without permanent deformation. Provide a means of leveling and locking the assembly at a selected height which requires deliberate action to change height setting and which prevents vibrating displacement.

4. Pedestal Bases: Shall be fabricated of an all square base with not less than 16 square inches of bearing area and assembled to a stud or tube designed to engage the pedestal head assembly; secured to subfloor in accordance with manufacturer's recommendations.

5. Pedestal Heads: Shall be fabricated of a head plate with corresponding stud or tube which is designed to engage the pedestal base assembly. The head must be the proper type to positively locate the floor panel. The head shall provide a means to fasten the floor panel directly to the head.

6. Stringer system shall be all steel construction, designed and fabricated to interlock with pedestal head and to form a modular grid pattern with members under edges of all field floor panels. Stringer shall snap on to the pedestal head.

7. Vertical Closures (Fascia): Metal closure with factory applied finish acceptable to the Architect at exposed edges of access flooring; of sufficient gauge to ensure rigidity.

8. Lifting Device: Portable panel lifting device, type required for panel finish specified.

9. Grommets and cut-outs: Sizes as indicated on the Drawings. Grommets shall be black unless otherwise noted; manufacturer's standard.

10. Rubber and/or plastic trim at tile cutouts: standard to the manufacturer; shop fabricated.

11. Finishes: High pressure laminate tile, 1/8" thick. Manufacturer: Nevamar, Color: ST-6-1 Grey Starlite, Provide vinyl edge trim for tile coverings– mechanically locked and bonded to the panel surface and flush with the surface covering.

12. Cutouts: Furnish floor panels with shop fabricated cut-outs. Trim edges of cut-outs with plastic molding, standard to the manufacturer. Refer to Drawings for location sizes and total quantities of cutouts.

13. Provide ramp with non-slip rubber floor tile at ramp: in color as selected by the Architect.

2.03 RAILINGS

A. Satin finished aluminum railings and handrails:

1. Railing components shall be type and grade as selected by manufacturer and as required to support design loading.

2. Size and wall thickness as indicated or as required to support design loading and comply with NYC Building Code.

3. Provide brackets, end closures, flanges, miscellaneous fittings and anchors for connections and for attachment of railings to adjacent substrates and/or structures.

3. Provide for removable railings where indicated or as required.

PART 3 - EXECUTION

3.01 PREPARATION

A. Examine the areas and conditions where access flooring is to be installed and notify the Contractor of conditions detrimental to the completion of the work including but not limited to unevenness, irregularities and dampness that would affect the quality and execution of the work.

B. Do not proceed with the work until unsatisfactory conditions have been corrected.

C. Substrates shall be level, clean and dry.

D. Concrete sealers used shall be identified and verified as compatible with pedestal adhesive prior to commencement of work. Coordinate with Section 03320 "Lightweight Fill, Flash Patching and Leveling Compound".

E. Take field measurements prior to the preparation of shop drawings and fabrication to ensure proper fitting of access flooring. Verify dimensions of interfaces i.e. level of abutting floors, ledges and door sills which could affect the installation.

F. Complete subfloor preparation and vacuum dust, dirt and debris before starting installation.

1. Apply leveling compound in accordance with the applicable requirements of Section 03320 "Lightweight Fill, Flash Patching and Leveling Compound".

G. Layout access floor grid pattern on substrate locating cutouts, penetrations and other items, coordinate layout with related trades during pre-installation conference.

3.02 INSTALLATION

A. Install access flooring and set pedestals in adhesive or mechanical fasteners where required in accordance with manufacturer's instructions.

B. Keep the number of cut panels to a minimum. Scribe cut panels with no voids greater than 1/8" at adjacent vertical surfaces, less than 1/2 panel units will not be acceptable.

C. Provide additional pedestals as needed to support panels where floor is disrupted by columns, doorways, walls, curbs and cutouts.

D. Scribe and fit vertical closures to subfloor and adjacent finish floor. Set in mastic and seal for plenum effect.

E. Vacuum clean the area as installation proceeds, extend the cleaning under installed panels as far as possible.

F. Level installed access flooring to within 0.10" of true level over the entire area and within 0.0625" in any 10 inch distance.

G. Installed system shall be free of vibration, rocking, rattles, squeaks and other unacceptable performance.

H. Understructure shall be aligned such that all uncut panels are interchangeable and fit snugly but do not bind when placed in alternate positions.

I. Railings:

1. Adjust railings prior to anchoring, match alignment at abutting joints.

2. Space posts as indicated and/or as required by design loading. Plumb posts in each direction.

3. Provide removable railing sections. Furnish slip fit metal socket or sleeve for casting into concrete. Accurately locate sleeves to match post spacing.

4. Secure handrails to wall with wall brackets and wall return fittings. Provide brackets with not less than 1-1/2 inch clearance from inside face of handrail and finished wall surface. Locate brackets as indicated and/or as required for design loading. Use appropriate method of attachment to the required substrate, which is subject to review and acceptance of the Architect.

3.03 CLEANING AND PROTECTION

A. After installation, vacuum clean the entire floor system and cover with sheets of reinforced paper or plastic. Maintain protective covering until directed to remove.

B. Repair or replace access floor panels which are stained, scratched or otherwise damaged or do not conform to specified requirements; as directed by the Architect.

END OF SECTION

SECTION 10800

TOILET ACCESSORIES

PART 1 - GENERAL

1.01 SUMMARY

A. Work of this Section is governed by General Conditions of the Contract and by provisions contained in Division 0 and Division 1 of these Specifications.

B. Work Included: This Section generally includes the following:

1. Toilet accessories as shown and as scheduled on the Drawings.

2. Adjustment, cleaning and protection of accessories.

C. Related Work

1. Rough carpentry [Wood Blocking] - Section 06100.

2. Mirror [frameless] glazing - Section 08800.

3. Gypsum board systems [and reinforcement] - Section 09250.

4. Tile work- Section 09300.

5. Metal toilet partitions- Section 10160.

1.02 QUALITY ASSURANCE

A. Accessory Locations: Coordinate accessory locations with other work to avoid interference and to assure proper anchorage, operation and servicing or accessory units. Verify dimensional compatibility of countertop thickness[es] and and countertop mounted soap dispenser [if applicable].

B. Inserts and Anchorages: Furnish inserts and anchoring devices which must be set in other work and coordinate their delivery to avoid delay.

C. Products: Provide products of same manufacturer for each type of accessory unit and for units exposed in same areas.

D. Code Requirements: Provide grab bars of types, capable of sustaining loads, as required by authorities having jurisdiction.

1.03 SYSTEM PERFORMANCE

A. Grab bars shall be capable of supporting 250 pounds without bending or shearing. Fasteners shall be capable of withstanding 250 pounds. Grab bars shall not rotate within their fittings.

B. Utility shelves shall be capable of supporting 200 pounds.

1.04 SUBMITTALS

A. Product Data: Submit manufacturer's technical data, catalog cuts and installation instructions for each toilet accessory.

B. Setting Drawings: Provide setting drawings, templates, instructions, and directions for installation of anchorage devices in other work.

C. Submit schedule of accessories indicating quantity and location of each item.

D. Samples: Submit samples of toilet accessories as requested by Architect.

E. Warranty: Submit copy of manufacturer's warranty for a period of one year after substantial completion.

1.05 DELIVERY, STORAGE AND HANDLING

A. Deliver accessories to the site, ready for use, in the manufacturer's original and unopened containers and packaging, bearing labels as to type or material, manufacturer's name and brand name.

B. Store and handle accessories in accordance with manufacturer's instructions.

C. Remove materials which are disfigured, scratched or not suitable and replace with new materials.

PART 2 - PRODUCTS

2.01 MANUFACTURERS/TYPE

A. Refer to Schedule on Drawings.

2.02 MATERIALS, GENERAL

A. Finish: Stainless steel to match Architect's sample.

B. Galvanized Steel Sheet: ASTM A527, G60.

C. Fasteners: No exposed fastening devices are permitted except where expressly accepted by the Architect. Fastening devices shall be furnished with each accessory and shall be selected based on the type and material of accessory and the construction to which it is attached.

1. Exposed Fasteners, if any, shall match finishes on which they are being used.

2. Concealed Fasteners shall be galvanized or cadmium plated steel.

2.03 FABRICATION

A. Stamped names or labels on exposed faces of toilet accessory units are not permitted. Unobtrusive labels on surfaces not exposed to view are acceptable.

B. Fabricate units with tight seams and joints, exposed edges rolled. Hang doors or access panels with continuous stainless steel piano hinge. Provide concealed anchorage.

C. Where locks are required for a toilet accessory, provide same keying throughout project. Furnish two keys for each lock.

PART 3 - EXECUTION

3.01 PREPARATION

A. Accessories shall be closely coordinated with work other trades, so that the necessary reinforcing is provided to receive the accessories.

B. Furnish templates and setting drawings and anchor plates required for the proper installation of the accessories at gypsum board.

C. Coordinate the work to ensure that base plates and anchoring frames are in the proper position to secure the accessories.

3.02 INSTALLATION

A. Install accessory units in accordance with manufacturer's instructions, using fasteners which are appropriate to substrate and recommended by manufacturer of unit.

B. Install units plumb and level, firmly anchored in locations and at heights indicated.

C. Unless otherwise indicated, locations of accessories shall conform to tile coursing and heights from the finished floor as shown on the drawings. Where locations are not indicated such locations shall be as directed by the Architect.

D. Do not crack, chip or damage tile surfaces. Protect adjacent finishes from abrasion, scratches or damage.

E. Coin boxes for dispenser type accessories shall be keyed alike, different from the other keyed accessories. Keys shall be delivered to the Owner's authorized agent, obtain receipt for delivery.

F. The Architect shall be the sole judge of workmanship. Open joints, weld and braze marks, poor connections, etc., will not be permitted.

3.03 ADJUSTING AND CLEANING

A. Adjust toilet accessories for proper operation and verify that mechanisms function smoothly and quietly. Replace damaged or defective items.

B. Clean and polish all exposed surfaces after removing labels and protective coatings.

C. Restore or replace installed work which is damaged or defective to the Architect's satisfaction, at no additional cost to the Owner.

END OF SECTION

SECTION 10900

MISCELLANEOUS SPECIALTIES

PART 1 - GENERAL

1.01 SUMMARY

A. Work of this Section is governed by General Conditions of the Contract and by provisions contained in Division 0 and Division 1 of these Specifications.

B. Work Included: This Section generally includes providing Miscellaneous Specialties as indicated on the Drawing Schedules. Include hardware and other required fittings as required for a complete installation. Work includes but is not limited to the following:

1. Clock, battery operated.

C. Related Work

1. Miscellaneous Metals - Section 05500.

2. Gypsum Board systems - Section 09250.

1.02 SUBMITTALS

A. Samples: Submit (3) samples of finish, each type and kind; and other samples as may be required by the Architect.

B. Shop Drawings: Submit shop drawings including location plan, elevation and details including attachment to adjacent construction.

PART 2 - PRODUCTS

2.01 ITEM SPECIFICATIONS

A. Battery operated clock:

1.	Manufacturer:	Peter Pepper
2.	Model (Face)	843; single face #6.
3.	Mounting	Wall

4. Color/Finish: White with clear acrylic.

5. Operation: Quartz battery

PART 3 - EXECUTION

3.01 INSPECTION

A. Examine the areas and conditions where miscellaneous specialties are to be installed and notify the Contractor conditions detrimental to the completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected.

3.02 INSTALLATION

A. Comply with manufacturer's recommendations. Set in alignment with the adjacent surfaces. Install at location indicated square and plumb to comply with manufacturer's instructions.

3.03 ADJUST AND CLEAN

A. Clean surfaces promptly after installation, exercise care to avoid damage to surfaces.

B. Protect miscellaneous specialties items from damage until acceptance of work.

END OF SECTION

SECTION 11900

MISCELLANEOUS EQUIPMENT

PART 1 - GENERAL

1.01 SUMMARY

A. Work of this Section is governed by General Conditions of the Contract and by provisions contained in Division 0 and Division 1 of these Specifications.

B. Work Included: This Section generally includes providing Miscellaneous Equipment as indicated on the Drawings and Schedules. Include hardware and other required fittings as required for a complete installation

C. Related Work

1. Rough carpentry - Section 06100.

2. Architectural woodwork - Section 06400.

3. Gypsum board systems - Section 09250.

4. Painting and finishing - Section 09900.

5. Plumbing - Division 15 Series.

6. Electrical - Division 16 Series.

1.02 SUBMITTALS

A. Samples: Submit (3) color metal samples of each finish; and other samples as may be required by the Architect.

B. Shop Drawings: Submit shop drawings showing anchorage devices and construction indicating field verified dimensions (if any).

C. Warranties: Submit manufacturer's warranty for each equipment item for a period of one year from date of Substantial Completion.

1.03 QUALITY ASSURANCE

A. Comply with local code requirements for flame spread, smoke development and toxicity ratings.

PART 2 - PRODUCTS

2.01 MANUFACTURER/TYPE

A. Refer to Drawings and Schedules.

PART 3 - EXECUTION

3.01 INSPECTION

A. Examine the areas and conditions where miscellaneous equipment items are to be installed and notify the Contractor conditions detrimental to the completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected.

3.02 INSTALLATION

A. Comply with manufacturer's recommendations. Set in alignment with the adjacent surfaces. Shim base to level and install at location indicated square and plumb to comply with manufacturer's instructions. Space fasteners as recommended by manufacturer. Install backup reinforcing plates when required. Provide flush hairline joints against adjacent surfaces where possible and matching flush filler panels and strips to fill in all horizontal and vertical gaps. Coordinate with related trades.

3.03 ADJUST AND CLEAN

A. Clean surfaces promptly after installation, exercise care to avoid damage to surfaces.

B. Protect miscellaneous equipment items from damage until acceptance of work.

END OF SECTION

SECTION 12525

WINDOW TREATMENT

PART 1 - GENERAL

1.01 SUMMARY

A. Work of this Section is governed by General Conditions of the Contract and by provisions contained in Division 0 and Division 1 of these Specifications.

B. Work Included: This Section generally includes the following:

1. Motorized and manual solar shades at windows where indicated on Drawings and schedules. Provide group system control for each space.

2. Blackout shades at windows where indicated on Drawings and schedules; installed in tandem with solar shades.

4. Accessories and hardware as required for a complete installation.

5. Trim and closure pieces as required.

6. Refer to drawings for description of solar and blackout shade fabric.

C. Related Work

1. Rough Carpentry - Section 06100.

2. Gypsum board systems - Section 09250.

1.02 SUBMITTALS

A. Shop Drawings: Submit drawings indicating location, type and size of units. Shop drawings must show details of installation and adjacent construction.

B. Product Data: Submit manufacturer's literature including installation, maintenance and cleaning instructions.

C. Samples: Submit full size sample of each window treatment type and exposed accessories. Submit sample in color specified.

D. Job Mock-Up: Install each type of window treatment if requested by Architect at a location to be determined. Approved mock-up shall be used as the standard for quality and workmanship.

1.03 QUALITY ASSURANCE

A. Provide each type of window treatment as complete assemblies produced by one manufacturer, including hardware, accessory items, mounting brackets, and fastenings.

1.04 WARRANTY

A. Provide a 5 year against defects in quality or workmanship from date of Substantial Completion.

1.05 DELIVERY, STORAGE AND HANDLING

A. Protect window treatment from damage, soiling and deterioration during transit, storage and handling.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Solar shades and blackouts shades operated in tandem shall be electrically operated types as manufactured by Vimco, or approved equal by Electroshade, Inc, or Sol-R-Veil. Provide motorized system where indicated. Provide low voltage switch to coordinate with audio visual requirements (when required). Window shades: Refer to Drawings.

B. Size: As indicated on drawings and as required to hang from top of ceiling pocket to top of floor finish, unless noted otherwise; and from column to column, unless noted otherwise.

C. Motor: shal be asynchronous capacitor start and run single phase type operating on 20v-60Hz; utilizing planetary type gears, solonoid activated disc brakes and built-in limit switch units; with built in thermal protection. Tubular in shape and totally enclosed within roller tube.: As indicated on drawings and as required to hang from top of ceiling pocket to top of floor finish, unless noted otherwise; and from column to column, unless noted otherwise.

PART 3 - EXECUTION

3.01 INSPECTION

A. Examine the areas and conditions where window treatment is to be installed and notify the Architect of conditions detrimental to the completion of the work.

B. Do not proceed with the work until unsatisfactory conditions are corrected.

3.02 PREPARATION

A. Window surfaces shall be clean with obstructions and projecting objects removed prior to installation.

3.03 INSTALLATION

A. Coordinate with the work of other trades to assure proper provisions for interface with window treatment installation.

B. Install window treatment in strict accordance with the recommendations of the *manufacturer*.

C. Upon completion of the installation, put all components through at least 10 complete cycles of operation, adjusting as necessary to achieve optimum operation.

1. Window treatment shall lay flat without buckling, curling, or shifting sideways more than ± 1/8" in either direction.

3.04 PROTECTION AND CLEANING

A. Protect installed units to ensure proper operating condition, without damage or blemishes. Repair or replace damaged units as directed by the Architect.

END OF SECTION

SECTION 16500

LIGHTING

PART 1 - GENERAL

1.01 SUMMARY

A. Work Included: The Work of this Section includes, but is not limited to the following:

1. Interior and exterior lighting fixtures including lamps, ballasts, accessories and other related components.

B. Related Sections:

1. Electrical Distribution
2. Wire & Cables
3. Outlet Boxes
4. Lighting Control Equipment
5. Automatic Louver Controls
6. Ceiling Support Systems
7. Sprinkler and HVAC Diffuser Locations
8. Emergency Lighting

1.02 DEFINITIONS:

A. Fixture: A complete lighting unit. Fixtures include lamps and parts required to distribute light, position and protect lamps, and connect lamps to power supply.

B. Luminaire: A fixture.

C. Lighting Unit: A fixture or an assembly of fixtures with a common support, including a pole or bracket plus mounting and support accessories.

D. Average Life: The time after which 50 percent fails and 50 percent survives under normal conditions.

1.03 SUBMITTALS:

A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.

B. Product Data: Fixtures, lamps, ballasts and poles or other mounting components. Arrange Product Data for fixtures in order of fixture designation. Include data on features and accessories and the following:

   1. Outline drawings indicating dimensions and principal features of fixtures.
   2. Electrical Ratings and Photometric Data: Certified results of independent laboratory tests for fixtures and lamps.

      a. Provide data as required to demonstrate that the submitted product meets or exceeds the performance of the specified fixture.
      b. Include photometric data charts: C.U., candlepower distribution and/or luminance information as necessary.
      c. Where technical charts alone cannot substantiate compliance, the submitting manufacturer may be required to provide a full photometric study of a specific project application for verification.

   3. Lamp Data: Manufacturer, ordering code and technical information.
   4. Ballast Data: Manufacturer, ordering code and technical data showing compliance with requirements.

      a. Where a fixture manufacturer will utilize ballasts from multiple manufacturers depending on availability, technical data must indicate the minimum characteristics that will be met in all cases.

C. Shop Drawings detailing nonstandard fixtures and indicating dimensions, weights, method of field assembly, components, features, and accessories.

D. Wiring diagrams detailing wiring for control system showing both factory-installed and field-installed wiring for specific system of this Project, and differentiating between factory-installed and field-installed wiring.

E. Coordination Drawings showing fixtures mounted on, in, or above ceiling. Indicate coordination with ceiling grids and other equipment installed in vicinity.

F. Product certificates signed by manufacturers of lighting fixtures certifying that their products comply with specified requirements.

G. Field test reports indicating and interpreting test results specified in Part 3 of this Section.

H. Maintenance data for fixtures to include in the operation and maintenance manual specified in Division 1.

1.04 QUALITY ASSURANCE:

A. Fixture Materials: Provide fixture parts and components that are constructed of materials most appropriate to their use or function, and that are resistant to corrosion in a marine environment and mechanical stresses encountered in the normal application and function of the fixtures.

B. Electrical Component Standard: Provide components that comply with NFPA 70 and that are listed and labeled by UL.

C. Listing and Labeling: Provide fixtures and accessory components specified in this Section that are listed and labeled for their indicated use and installation conditions on Project.

1. Special Listing and Labeling: Provide fixtures for use in damp or wet locations, underwater, and recessed in combustible construction that are specifically listed and labeled for such use. Provide fixtures for use in hazardous (classified) locations that are listed and labeled for the specific hazard.
2. The Terms "Listed" and "Labeled": As defined in the National Electrical Code, Article 100.
3. Listing and Labeling Agency Qualifications: A "Nationally Recognized Testing Laboratory" (NRTL) as defined in OSHA Regulation 1910.7.

D. Applicable Codes: Fixtures shall be made and installed in accordance with the current version of the National Electric Code, the Uniform Building Code, the Federal Occupational Safety & Health Act, local codes, and other applicable regulations.

E. Measuring and Testing Equipment: Instruments for the measurement of voltage, luminaire temperature, lighting level and fixture brightness level shall be available at all times on the site.

1.05 WARRANTY:

A. General Warranty: The special warranty specified in this Article shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by the Contractor under requirements of the Contract Documents.

B. Special Warranty: Submit a written warranty signed by manufacturer and Installer agreeing to replace external parts of lighting fixtures exhibiting a failure of finish as specified below. This warranty is in addition to, and not a limitation

of, other rights and remedies the Owner may have under the Contract Documents.

1. Protection of Metal from Corrosion: Warranty against perforation or erosion of finish due to weathering.
2. Color Retention: Warranty against fading, staining, and chalking due to effects of weather and solar radiation.
3. Special Warranty Period: 5 years from date of Substantial Completion.

1.06 DELIVERY, STORAGE AND HANDLING:

A. Delivery: Luminaires and lighting equipment shall be delivered to the project complete, including mounting devices, lamps and components necessary for the proper operation of the equipment.

B. Marking: All equipment must be clearly and boldly identified as to the fixture type and, where practicable, the fixture location.

1. Voltage identification: Fixtures designed for voltages other than 110-125 volt circuits shall be clearly marked.
2.. Lamp/ballast coordination: Fixtures equipped with ballasts for operation of rapid start lamps shall be plainly marked "Use Rapid Start Lamps Only". Similarly, fixtures equipped with ballasts or other components requiring use of specific types of lamps shall be plainly marked. Markings must be clear and shall be located to be readily visible to service personnel *but invisible from normal viewing angles* when lamps are in place.

C. Timely Purchase: Luminaires, associated lamps and other allied equipment shall be ordered in a timely fashion and securely stored to be available to meet the project schedule.

1.07 EXTRA MATERIALS:

A. Furnish extra materials described below that match products installed, are packaged with protective covering for storage, and are identified with labels describing contents.

1. Lamps: 10 lamps for every 100 of each type and rating installed. Furnish at least one of each type.
2. Plastic Diffusers and Lenses: 1 for every 100 of each type and rating installed. Furnish at least one of each type.
3. Ballasts: 1 for every 100 of each type and rating installed. Furnish at least one of each type.

4. Globes and Guards: 1 for every 20 of each type and rating installed. Furnish at least one of each type.
5. Parabolic Louvers and Reflector Cones: 1 for every 100 of each type. Furnish at least one of each type.

PART 2 - PRODUCTS

2.01 MANUFACTURERS:

A. Available Products: Subject to compliance with requirements, fixtures that may be incorporated into the Work include, but are not limited to, the products specified in the Lighting Fixture Schedule at end of this Section. The photometric performance of all submitted products must meet or exceed the performance of the specified fixtures where proposed.

2.02 FIXTURES AND FIXTURE COMPONENTS, GENERAL:

A. Sheet Metal Components: Provide the required dimensional thickness of metal, plastic and composite materials so that all fixtures are rigid, stable and will resist deflection, twisting, warping under normal installation, and relamping procedures.

1. All luminaire housings shall be minimum 0.84mm cold rolled steel, unless a heavier gauge is specified or required by code.
2. All aluminum extrusion housings shall be minimum 5mm thick.
3. All spun, hydro-formed or sheet aluminum reflectors shall be fabricated from #12 aluminum sheets minimum, 1.45mm or heavier. Material shall be 3002 alloy, 99.5% pure aluminum with uniform grain structure.
4. All spun aluminum housings shall be of an alloy of the 5000 series (ANSI/ASTM-B209-1977) or of an alloy that is found to have equal corrosion resistance.

B. Joints: Provide positive, durable, means of connection at all joints as required. No hollow rivets, unless specifically approved.

C. Gaskets: Provide neoprene, silicone, rubber, or other appropriate gaskets, stops, and barriers where required to prevent light leak, control sound and vibration, prevent water leaks and, if pertinent, water vapor penetration.

D. Edges: Provide finished product with the following minimum qualities:

1. Ground and/or burr free metal edges.
2. Tight fitting connections, hinges and closures.
3. Clean neat corners, edges, trims and frames.

E. Castings: All cast parts, including die-cast members, shall be of uniform quality; free from blow holes, pores, hard spots, shrinkage defects, cracks and or other imperfections that affect strength and appearance, or are indicative of inferior metals or alloys.

F. Reflecting Surfaces: Minimum reflectance as follows, except as otherwise indicated:

1. White Surfaces: 85 percent.
2. Specular Surfaces: 83 percent.
3. Diffusing Specular Surfaces: 75 percent.
4. Laminated Silver Metallic Film: 90 percent.

G. Lenses, Diffusers, Covers, and Globes: 100 percent virgin acrylic plastic or water white, annealed crystal glass, except as otherwise indicated. Greenish-tinted lenses are not acceptable. Heat resistant where required: borosilicate or Pyrex glass.

1. Plastic: High resistance to yellowing and other changes due to aging, exposure to heat, and UV radiation.
2. Lens Thickness: 0.125 inch (3 mm) minimum; except where greater thickness is indicated.

H. Doors, Frames, and Other Internal Access: Smooth operating, free from light leakage under operating conditions, and arranged to permit relamping without use of tools. Arrange doors, frames, lenses, diffusers, and other pieces to prevent accidental falling during relamping and when secured in operating position.

I. Fixture Support Components: Comply with Division 16 Section "Basic Electrical Materials and Methods."

1. Single-Stem Hangers: 1/2-inch (12-mm) steel tubing with swivel ball fitting and ceiling canopy. Finish same as fixture.
2. Twin-Stem Hangers: Two, 1/2-inch (12-mm) steel tubes with single canopy arranged to mount a single fixture. Finish same as fixture.
3. Rod Hangers: 3/16-inch (5-mm-) minimum diameter, cadmium-plated, threaded steel rod.
4. Hook Hanger: Integrated assembly matched to fixture and line voltage and equipped with threaded attachment, cord, and locking-type plug.

J. Instant Restrike Device: Solid-state, potted module, mounted inside HPS fixture and compatible with HPS lamps, ballasts, and sockets up to 150 W.

1. Restrike Range: 105 to 130 VAC.
2. Maximum Voltage: 250 V peak or 150 VAC RMS.

K. Auxiliary, Instant-On, Quartz System: Automatically switches quartz lamp when fixture is initially energized and when momentary power outages occur. Turns quartz lamp off automatically when HID lamp reaches approximately 60 percent light output.

L. Track-Lighting Systems: Provide components, including track, fittings, and fixtures, from same manufacturer and as recommended by manufacturer for intended use.

1. Maintain a continuity of conductors through feeds, splices, and boxes. The relative positions of live and neutral conductors must always be maintained along a continuous run so that track fittings connect into the track in a consistent manner.
2. Install surface mounted track straight and true regardless of the ceiling contour.

M. Pole reinforcement: Provide reinforcement for all exterior pole mounted luminaires in accordance with manufacturer's recommendations. Reinforcement shall be designed to prevent overturning or permanent deflection in winds up to 161 km/hr., or in winds equal to the local maximum annual wind velocity, whichever is greater. Existing soil conditions should be taken into account. Include in submissions details of all pole reinforcements for approval by Structural Engineer.

N. Cast-in fixtures: Housings installed directly in concrete shall be fabricated of hot dip galvanized steel or cast aluminum. Where cast aluminum housings are used, give two coats of asphaltum paint prior to installation. To prevent direct contact of housing to concrete, 3mm thick x 51mm diameter solid neoprene grommets shall be furnished at every point light fixture surfaces are mounted to concrete structure.

2.03 FINISHES:

A. Manufacturer's standard, except as otherwise indicated, applied over corrosion-resistant treatment or primer, free of streaks, runs, holidays, stains, blisters, and similar defects.

1. Prior to finishing, all surfaces must be free from foreign materials such as dirt, rust, oil, polishing compounds and mold release agents.

2. Where necessary, surface cleaned by accepted chemical means shall receive corrosion inhibiting phosphating treatment assuring positive paint adhesion.
3. All castings and extrusions shall be machined, sanded or similarly treated, and given minimum one coat of baked-on clear methacrylate lacquer, unless a painted finish is specified.
4. Aluminum surfaces exposed to weather (other than anodized reflectors covered elsewhere) receive a duronodic or polyester powder paint finish as specified for corrosion resistance.
5. Sheet steel fixture housings, iron and steel parts, which have not received phosphating treatment ("Bonderizing" or similar process) or are to be utilized in exterior applications, are to be made corrosion resistant by zinc or cadmium plating or hot-dip galvanizing.
6. Anodized aluminum reflectors requiring "exterior" shall have a minimum of 0.02mm anodizing thickness.

2.04 LAMPS:

A. Fluorescent Color Temperature and Minimum Color-Rendering Index (CRI): 3000 K and 85 CRI, except as otherwise indicated.

B. Non-compact Fluorescent Lamp Life: Rated average is 20,000 hours at 3 hours per start when used on rapid start circuits.

C. Metal Halide Color Temperature and Minimum Color-Rendering Index (CRI): 3600 K and 70 CRI, except as otherwise indicated.

2.05 LAMP HOLDERS:

A. Screw base: Screw base sockets for incandescent and metallic vapor lamps shall be of heavy duty heat resistant porcelain with spring center contacts and plated screw shells.

B. Fluorescent sockets: Fluorescent lamp sockets operating with an open circuit voltage in excess of 300 volts shall be of the safety type, that open the supply circuit when the lamp is removed from the sockets.

2.06 BALLASTS:

A. Fluorescent Ballasts: Electronic integrated circuit, solid-state, full-light-output, energy-efficient rapid start type, unless otherwise indicated; must be compatible with lamps and lamp combinations to which connected.

1. Underwriters Laboratories (UL) listed, Class P, Type 1.

2. Certification by Certified Ballast Manufacturers Association (CBM).
3. Ballast shall be rapid start, unless otherwise indicated. Ballast starting parameters shall be consistent with lamp manufacturers' recommendations and shall provide full rated lamp life under normal operating conditions.
4. Ballast shall have audible noise rating of Class "A" except as otherwise indicated.
5. Voltage: Match connected circuits.
6. Lamp Flicker: Less than 5 percent.
7. Minimum Power Factor: 90 percent.
8. Total Harmonic Distortion (THD) of Ballast Current: 20 percent or less.
9. Minimum Ballast Factor (relative light output): 88 percent for T8 lamps, 87 percent for T5 compact fluorescents, 90 percent for all T4 compact fluorescents.
10. Multi-lamp Ballasts: Use 2, 3, or 4 lamp ballasts for multi-lamp fixtures where possible.
11. Lamp-ballast connection method shall not reduce normal rated life of lamps.
12. Ballast shall comply with all applicable local, state, and federal efficiency standards.
13. For lamps smaller than one inch in diameter (all T2, T4 and T5 lamps) ballasts shall be equipped with a cut-off circuit that senses an over-voltage condition to the lamp for end-of-life protection.
14. Low-Temperature Fluorescent Ballasts: Comply with above requirements, except ballast may be Class P electromagnetic type. Starting temperature shall be minus 20 deg. F or colder, or the minimum available depending on lamp type.
15. Dimming Ballasts: Electronic rapid start type providing smooth dimming over a minimum range from 100 to 5 percent light output (unless otherwise specified). Listed for use with specific fluorescent dimming system provided. Dimming systems are specified in Division 16 Section "Lighting Control Equipment." Fluorescent wall dimmers are specified in Division 16 Section "Wiring Devices."
16. Remote Ballasts: Where ballasts must be mounted remotely from fixtures, the Contractor is responsible for locating the ballasts at a distance which does not exceed the manufacturer's recommended limitations.

B. HID Ballasts: Include the following features, except as otherwise indicated.

1. Constant wattage auto-transformer (CWA) or regulating high-power-factor type, unless otherwise indicated.
2. Conform to UL 1029 and ANSI C82.4.
2. Operating Voltage: Match system voltage.
3. Single-Lamp Ballasts: Minimum starting temperature of minus 30 deg F.
4. Normal Ambient Operating Temperature: 40 deg F.

5. Open circuit operation will not reduce average life.
6. High-Pressure Sodium (HPS) Ballasts: Equip with a solid-state igniter/starter having an average life in pulsing mode of 10,000 hours at an igniter/starter case temperature of 90 deg F.
7. Encapsulation: Manufacturer's standard epoxy-encapsulated model designed to minimize audible fixture noise.

2.07 TRANSFORMERS:

A. Suitability: Transformers shall be of the best quality and sized to compensate for voltage drop over indicated distances and meet with the following requirements:

1. Where possible transformers have an integral line voltage switch.
2. All transformers shall be locally fused.
3. Provide adequate ventilation to meet code and manufacturers requirements concerning temperature rise.

PART 3 - EXECUTION

3.01 INSTALLATION:

A. Set units plumb, square, and level with ceiling and walls, and secure according to manufacturer's written instructions and approved Shop Drawings. Support fixtures according to requirements of Division 16 Section "Basic Electrical Materials and Methods."

B. Support for Recessed and Semi-recessed Grid-Type Fluorescent Fixtures: Units may be supported from suspended ceiling support system. No movement permitted after installation. Install ceiling support system rods or wires at a minimum of 4 rods or wires for each fixture, located not more than 6 inches (150 mm) from fixture corners.

1. Install support clips for recessed fixtures, securely fastened to ceiling grid members, at or near each fixture corner.
2. Fixtures Smaller than Ceiling Grid: Install a minimum of 4 rods or wires for each fixture and locate at corner of ceiling grid where fixture is located. Do not support fixtures by ceiling acoustical panels.
3. Fixtures of Sizes Less than Ceiling Grid: Center in acoustical panel. Support fixtures independently with at least two 3/4-inch (20-mm) metal channels spanning and secured to ceiling tees.

C. Support for Suspended Fixtures: Brace pendants and rods over 48 inches (1200 mm) long to limit swinging. Support stem-mounted, single-unit, suspended

fluorescent fixtures with twin-stem hangers. For continuous rows, use tubing or stem for wiring at one point and tubing or rod or cable for suspension for each unit length of chassis, including one at each end.

1. Provide all mounting components required for installation, including hickeys, stud-extensions, ball-aligners, canopies and stems.
2. Provide stems on pendant fixtures of the correct length to uniformly maintain the fixture heights shown on the drawings or established in the field.

D. Air-Handling Fixtures: Install with dampers closed.

E. Lamping: Where specific lamp designations are not indicated, lamp units according to manufacturer's instructions.

F. Installation Sequence: Install fixture mounting frames, plaster rings, etc. prior to the trim assembly, which shall not be installed until the project is "broom clean". Where the fixture location or construction does not permit sequential installation, all reflectors, lenses, flanges and other visible surfaces shall be carefully protected.

G. Cast-in Fixtures: Housings installed directly in concrete shall be fabricated of hot dip galvanized steel or cast aluminum. Where cast aluminum housings are used, give two coats of asphaltum paint prior to installation. To prevent direct contact of housing to concrete, 3mm thick x 51mm diameter solid neoprene grommets shall be furnished at every point light fixture surfaces are mounted to concrete structure.

3.02 WIRING:

A. Minimum standards: All wiring shall comply with the following standards:

1. All wiring within lighting fixtures or from the splice with the building wiring shall be as specified under "WIRE AND CABLES".
2. Wiring between fluorescent lamp holders and associated operating and starting equipment shall be of similar or heavier gauge than the leads furnished with the approved ballasts.
3. Wire leads to the receptacle or connector of any side prong incandescent lamp or any "cool-beam" lamp, or any lamp 200 watts or over shall be SF-2 (silicone rubber insulated) stranded wire.
4. Wiring within fixture construction is to be concealed, except where the fixture design or mounting dictates otherwise.
5. Joints in wiring within lighting fixtures and connections of the fixture wiring to the wiring of the building shall be as specified under "WIRE AND

CABLES" with special attention to paragraphs relating to high amperage, low voltage conditions.

6. Wiring channels and wireways shall be free from projections and rough or sharp edges throughout, and at all points or edges over which conductors must pass and may be subject to injury or wear.
7. Insulated bushings shall be installed at points of entrance and exit of flexible wiring.

3.03 CONNECTIONS:

A. Ground lighting units. Tighten electrical connectors and terminals, including grounding connections, according to manufacturer's published torque-tightening values.

3.04 FIELD QUALITY CONTROL:

A. Inspect each installed fixture for damage. Replaced damaged fixtures and components.

B. Give advance notice of dates and times for field tests.

C. Provide instruments to make and record test results.

D. Tests: Verify normal operation of each fixture after fixtures have been installed and circuits have been energized with normal power source.

E. Replace or repair malfunctioning fixtures and components, then retest. Repeat procedure until all units operate properly.

F. Report results of tests.

G. Replace fixtures that show evidence of corrosion during Project warranty period.

3.05 CLEANING AND ADJUSTING:

A. Installation sequence: Lighting fixture trim assemblies and/or decorative finishing components shall not be installed until the project is "broom clean". When the fixture location or construction schedule prohibits sequential installation, all reflectors, lenses, flanges and other visible surfaces shall be protected.

B. Clean fixtures after installation: Remove all protective strippable coatings, dust, finger marks, paint spots and any materials deleterious to the appearance or functioning of the fixtures. Use methods and materials recommended by manufacturer. Abrasive cleaners are not permitted.

C. Focusing and adjustment: After installation of all lighting fixtures, finishes and furnishings has been completed, provide personnel, ladders or lifts, spare lamps and any other equipment necessary to expeditiously focus all lighting. Focusing shall be performed *after dark*, unless all visible daylight can be screened out of the focusing area, and shall take place under supervision of the Lighting Designer, Architect and/or Owner except where specific aiming diagrams and/or scene programming data have been provided within the Contract Documents. All work shall be performed in accordance with union rules, should they be in force, and applicable codes.

1. Aim all adjustable lighting fixtures according to instructions.
2. Program preset dimming system "scene" lighting levels, where applicable.

3.06 FINAL INSPECTION:

A. Upon completion of the installation, lighting equipment must be in first class operating order and free from defects in condition and finish.

1. At time of final inspection, all fixtures and equipment must be installed and lamped with *new* lamps and be complete with all lenses, diffusers, reflectors, side panels, louvers or other necessary components.
2. Fixtures shall be completely clean and free from finger marks, dust, plaster or paint spots.
3. Any reflectors, lenses, diffusers, side panels or other parts damaged prior to the final inspection shall be replaced.
4. Exterior poles, bollards, bases and other exterior fixtures shall be painted to match factory color where finish has been scratched or damaged.
5. Housings shall be rigidly installed and adjusted to a neat flush fit with the ceiling.
6. *No light leaks* shall be permitted at the ceiling line or from any visible part or joint.

LUMINAIRE SCHEDULE

TYPE	DESCRIPTION	LAMP CODE	MANUFACTURER/CATALOG
A	Recessed 3-lamp compact fluorescent parabolic 2x2	(3) FT40DL/830/RS	LIGHTOLIER D3A2(ceiling type)9LE 3U4BX-277SB-JSD electronic ballast with integrated cut-off circuit to sense an over-voltage condition to the lamp; fixtures shall supply air return capability - Engineer to confirm; Architect to verify ceiling type for trim coordination
A1	Recessed 2-lamp compact fluorescent parabolic 2x2	(2) FT40DL/830/RS	LIGHTOLIER D3A2(ceiling type)9LE 2U4BX-277SB-JSD electronic ballast with integrated cut-off circuit to sense an over-voltage condition to the lamp; fixtures shall supply air return capability - Engineer to confirm; Architect to verify ceiling type for trim coordination
B	Surface/cove mounted linear fluorescent asymmetric uplight	(2) FO17/830 (2') (2) FO25/830 (3') (2) FO32/830 (4') (2) FO40/830 (5') (2-lamp cross section; quantity depends upon run length)	NEORAY 74IC/2T8-EB277V-LAR-JSD lengths as required - see Architectural drawings; no mixing of lamp lengths within the same continuous run

LUMINAIRE SCHEDULE

TYPE	DESCRIPTION	LAMP CODE	MANUFACTURER/CATALOG
C	Recessed dimmable compact fluorescent "indirect" 2x2	(2) FT40DL/830/RS	FOCAL POINT FBX-22-B-2-BX40-S/HILUME-277-(mounting)-PS-NO-AG modified with Lutron "Hi-Lume" electronic dimming ballast; Architect to verify ceiling type for trim coordination; for use with coordinated Lutron dimming controls only
D	Surface/wall mounted linear fluorescent perforated metal uplight - Trading Room	FO25/830 (3') FO32/830 (4') FO40/830 (5') (1-lamp cross section - quantity depends upon run length)	ZUMTOBEL ZX-W-Series-277V-LAR lengths as required - see Architectural drawings
F	Surface/ceiling mounted linear fluorescent perforated metal uplight - Trading Room	FO32/830 (4') (1 lamps per 4' length - quantity depends upon run length)	ZUMTOBEL RCAII-1/32W T8-277V-EB-Series with electronic ballast
G	Recessed dimmable compact fluorescent linear parabolic	(2) FT40DL/830/RS	ZUMTOBEL RNC-2/40CFL-7"x4'-277V-DIM-HILUME modified for (2) 40W compact fluorescent biax lamps with Lutron "Hi-Lume" electronic dimming ballast; for use with coordinated Lutron dimming controls only; see Architectural drawings to verify mounting detail and flange for gypsum board ceiling

LUMINAIRE SCHEDULE

TYPE	DESCRIPTION	LAMP CODE	MANUFACTURER/CATALOG
H	Recessed dimmable compact fluorescent downlight	(2) CF26DD/E/830	EDISON PRICE DPX 226/8-277-COL-WF-DM-RSA with white flange and Lutron "Hi-Lume" electronic dimming ballast; for use with coordinated Lutron dimming controls only
H1	Recessed compact fluorescent downlight	(2) CF26DD/E/830	EDISON PRICE SB 226/8-277-COL-WF-RSA with white flange and electronic ballast with integrated cut-off circuit to sense an over-voltage condition to the lamp
H2	Recessed compact fluorescent downlight	(2) CF26DD/E/830	EDISON PRICE DPX 226/8-277-COL-WF-RSA with white flange and electronic ballast with integrated cut-off circuit to sense an over-voltage condition to the lamp
J	Recessed dimmable compact fluorescent downlight/wallwasher	(2) CF26DD/E/830	EDISON PRICE DPX 226/8-277-COL-WF-DM-RSA with white flange and Lutron "Hi-Lume" electronic dimming ballast; for use with coordinated Lutron dimming controls only
K	Recessed low voltage downlight (to be dimmed)	Q71MR16/C/FL40°-EYC General Electric	EDISON PRICE DLMR/4-COL-WF-RSA with white flange

LUMINAIRE SCHEDULE

TYPE	DESCRIPTION	LAMP CODE	MANUFACTURER/CATALOG
L	Surface/wall mounted linear fluorescent perforated metal uplight - 10' length	(4) FO40/830 (5') (2-lamp cross section - quantity depends upon run length)	FOCAL POINT "Wayfinder" FLE-38-M-2-T8-E-277-WM-NS-NO-(finish)-AG final fixture selection and finish to be verified
L1	Surface/wall mounted linear fluorescent perforated metal uplight - 8' length	(4) FO32/830 (4') (2-lamp cross section - quantity depends upon run length)	FOCAL POINT "Wayfinder" FLE-38-M-2-T8-E-277-WM-NS-NO-(finish)- AG final fixture selection and finish to be verified
M	Recessed low voltage adjustable accent (to be dimmed)	Q71MR16/C/FL40°-EYC General Electric	EDISON PRICE Anglux MR-COL-WF-RSA with white flange
N	Recessed dimmable compact fluorescent open aperture downlight	CF32DT/E/830	KURT VERSEN P926-277V-DIM/HILUME-JQS with Lutron "Hi-Lume" electronic dimming ballast and white overlap flange; for use with coordinated Lutron dimming controls only
N1	Recessed dimmable compact fluorescent open aperture downlight/wallwasher	CF32DT/E/830	KURT VERSEN P905-277V-DIM/HILUME-JQS with Lutron "Hi-Lume" electronic dimming ballast and white overlap flange; for use with coordinated Lutron dimming controls only
P	Decorative corridor wall sconce	(3) CF13DD/830	AMERICAN GLASS LIGHT CO. "Double Keys" 22013-FCS-MOD/11"x24" GLASS SIZE/ CLIPS ONLY/3 PL-13

LUMINAIRE SCHEDULE

TYPE	DESCRIPTION	LAMP CODE	MANUFACTURER/CATALOG
Q	Surface/undercabinet mounted fluorescent tasklight	FO25/830 (3') FO32/830 (4') FO40/830 (5') (1-lamp cross section - quantity depends upon run length)	ALKCO SF300-Series-BW-RSW-120V with 45° batwing linear prismatic lens, integral rocker switch, and electronic ballast; wall switch control to be provided for three-way switching - Electrical Engineer to coordinate
R	Recessed compact fluorescent downlight with decorative glass lens	(2) CF26DD/E/830	ZUMTOBEL CLU 8"-2-CFQ 26W/ G24Q-3 277V-FAC-C-SAR-W-SAT-SQ-B "Satum" glass accessory style to be selected; with white flange and electronic ballast with integrated cut-off circuit to sense an over-voltage condition to the lamp
S	Surface/slot mounted low voltage adjustable angle wallwasher	(5) Q20MR16/C/ NSP15°-ESX (lamps spaced 5" o.c.) General Electric	NULUX Spredlux MR16-Series-RSA
T	Recessed low voltage square aperture downlight	Q50MR16/C/ NFL25°-EXZ General Electric (wire for 75W)	NULUX Spotlux MR-RSA
U	Recessed low voltage square aperture lensed wallwasher	Q50MR16/C/ NFL25°-EXZ General Electric (wire for 75W)	NULUX MRWL404S-RSA

LUMINAIRE SCHEDULE

TYPE	DESCRIPTION	LAMP CODE	MANUFACTURER/CATALOG
U1	Recessed low voltage square aperture lensed corner wallwasher	Q50MR16/C/ NFL25°-EXZ General Electric (wire for 75W)	NULUX MRWL404C-RSA
V	Recessed linear fluorescent parabolic stacklight	FO32/830 (4')	LINEAR LIGHTING CORP. RC68-D-1-ET8-277-PBS-(ceiling type)-NO-LAR-JQS Architect to verify ceiling type for fixture flange coordination; 4' increment lengths as required - see Architectural drawings for more information
Y	Recessed linear fluorescent slot wallwasher	FO25/830 (3') FO32/830 (4') FO40/830 (5')	LINEAR LIGHTING CORP. WW4-D-1-ET8-277-NS-R-NO-LAR-JQS lengths as required for wall-to-wall runs - see Architectural drawings for more information

ENDNOTES:

1. Electrical Engineer to verify supply voltage for all fluorescent fixtures.
2. All fluorescent lamps to have 3000K color temperature and 82 CRI, and be manufactured by Osram Sylvania or Philips.